

**HANDBOOK OF THE
BIRDS
OF INDIA
AND PAKISTAN**

**IN TEN VOLUMES
VOL. I**

HANDBOOK OF THE BIRDS OF INDIA AND PAKISTAN

*TOGETHER WITH THOSE OF
NEPAL, SIKKIM, BHUTAN AND CEYLON*

SÁLIM ALI
AND
S. DILLON RIPLEY

Volume 1
DIVERS TO HAWKS
Synopsis Nos. 1-224
Colour Plates 1-18

*Sponsored by the
Bombay Natural History Society*

OXFORD UNIVERSITY PRESS
Bombay London New York

Oxford University Press, Ely House, London W.1
GLASGOW NEW YORK TORONTO MELBOURNE WELLINGTON
CAPE TOWN SALISBURY IBADAN NAIROBI LUSAKA ADDIS ABABA
BOMBAY CALCUTTA MADRAS KARACHI LAHORE DACCA
KUALA LUMPUR HONG KONG TOKYO
Oxford House, Apollo Bunder, Bombay 1 BR

Oxford University Press, 1968

Sálim ALI 1896
Sidney Dillon RIPLEY 1913

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COLOUR PLATES

Synopsis numbers in brackets

(SE) = species extralimital (RE) = race extralimital

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A. M. HUGHES

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- 2 *Anas strepera strepera*, Gadwall (101)
- 3 *Anas crecca crecca*, Common Teal (94)
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- 5 *Anas querquedula*, Garganey (104)
- 6 *Anas clypeata*, Shoveller (105)
- 7 *Aythya fuligula*, Tufted Duck (111)
- 8 *Aythya nyroca*, White-eyed Pochard (109)
- 9 *Podiceps cristatus cristatus*, Great Crested Grebe (3)
- 10 *Podiceps ruficollis capensis*, Little Grebe (5)

Plate 2, facing page 32

A. M. HUGHES

- 1 *Pelecanus philippensis philippensis*, Spottedbilled Pelican (21)
- 2 *Phalacrocorax niger*, Little Cormorant (28)
- 3 *Phalacrocorax carbo sinensis*, Large Cormorant (26)
- 4 *Ibis leucocephalus*, Painted Stork (60)
- 5 *Threskiornis melanocephala*, White Ibis (69)
- 6 *Anhinga rufa melanogaster*, Darter (29)
- 7 *Anastomus oscitans*, Openbill Stork (61)
- 8 *Ciconia episcopus episcopus*, Whiteneked Stork (62)
- 9 *Leptoptilos dubius*, Adjutant Stork (67)
- 10 *Xenorhynchus asiaticus asiaticus*, Blacknecked Stork (66)

Plate 3, facing page 48

A. M. HUGHES

- 1 *Ardea cinerea rectirostris*, Grey Heron (36)
- 2 *Egretta alba modesta*, Large Egret (46)
- 3 *Egretta garzetta garzetta*, Little Egret (49)
- 4 *Ardea purpurea manilensis*, Purple Heron (37)
- 5 *Ardeola grayii grayii*, Pond Heron or Paddybird (42)
- 6 *Butorides striatus connectens*, Little Green Heron (38 RE)
- 7 *Bubulcus ibis coromandus*, Cattle Egret (44)
- 8 *Dupetor flavicollis flavicollis*, Black Bittern (58)
- 9 *Ixobrychus cinnamomeus*, Chestnut Bittern (56)
- 10 *Nycticorax nycticorax nycticorax*, Night Heron (52)

Plate 4, facing page 64

A. M. HUGHES

- 1 *Sarkidiornis melanotos melanotos*, Nakta (115)
- 2 *Cairina scutulata*, Whitewinged Wood Duck (116)
- 3 *Nettapus coromandelianus coromandelianus*, Cotton Teal (114)
- 4 *Anser anser rubrirostris*, Greylag Goose (81)
- 5 *Dendrocygna javanica*, Lesser Whistling Teal (88)
- 6 *Anser indicus*, Barheaded Goose (82)
- 7 *Tadorna ferruginea*, Brahminy Duck (90)
- 8 *Dendrocygna bicolor*, Large Whistling Teal (89)
- 9 *Anas platyrhynchos*, Mallard (100)
- 10 *Anas poecilorhyncha haringtoni*, Spotbill Duck (98)

Plate 5, facing page 96

G. J. F. COOMBS

- 1 *Phaethon rubricauda rubricauda*, Redtailed Tropic-bird (18)
- 2 *Ardea insignis*, Great Whitebellied Heron (33)
- 3 *Egretta gularis schistacea*, Indian Reef Heron (50)
- 4 *Botaurus stellaris stellaris*, Bittern (59)
- 5 *Ardea goliath*, Giant Heron (34)
- 6 *Pseudibis papillosa papillosa*, Black Ibis (70)
- 7 *Plegadis falcinellus falcinellus*, Glossy Ibis (71)
- 8 *Platalea leucorodia major*, Spoonbill (72)
- 9 *Ixobrychus sinensis*, Yellow Bittern (57)
- 10 *Ixobrychus minutus*, Little Bittern (55)

Plate 6, facing page 112

G. J. F. COOMBS

- 1 *Pelecanus onocrotalus*, Rosy Pelican (20)
- 2 *Ciconia ciconia ciconia*, White Stork (63)
- 3 *Ciconia nigra*, Black Stork (65)
- 4 *Phoenicopterus roseus*, Flamingo (73)
- 5 *Phoeniconaias minor*, Lesser Flamingo (74)
- 6 *Gypaetus barbatus aureus*, Bearded Vulture (188)
- 7 *Gyps himalayensis*, Himalayan Griffon (181)
- 8 *Neophron percnopterus ginguianus*, Scavenger Vulture (187)
- 9 *Pavo cristatus*, Common Peafowl (311)

Plate 7, facing page 144

D. V. COWEN

- 1 *Gorsachius melanolophus melanolophus*, Malay Bittern (53)
- 2 *Dupetor flavicollis flavicollis*, Black Bittern (58)
- 3 *Dendrocygna javanica*, Lesser Whistling Teal (88)
- 4 *Porphyrio porphyrio poliocephalus*, Purple Moorhen (349)
- 5 *Scolopax rusticola rusticola*, Woodcock (411)
- 6 *Galloperdix spadicea stewarti*, Red Spurfowl (277)

Plate 8, facing page 160

G. J. F. COOMBS

- 1 *Anser fabalis brachyrhynchus*, Pinkfooted Goose (SE)
- 2 *Anser albifrons albifrons*, Whitefronted Goose (79)
- 3 *Cygnus columbianus jankowskii*, Whistling Swan (85)
- 4 *Tadorna tadorna*, Common Shelduck (91)
- 5 *Anas angustirostris*, Marbled Teal (92)
- 6 *Anas formosa*, Baikal Teal (95)
- 7 *Anas gibberifrons albogularis*, Grey Teal (96)
- 8 *Anas falcata*, Falcated Teal (102)

Plate 9, facing page 176

DENNIS F. HARRIS

- 1 *Rhodessa caryophyllacea*, Pinkheaded Duck (106)
- 2 *Netta rufina*, Redcrested Pochard (107)
- 3 *Aix galericulata*, Mandarin Duck (113)
- 4 *Aythya marila marila*, Scaup Duck (112)
- 5 *Clangula hyemalis*, Longtail or Old Squaw Duck (117)
- 6 *Bucephala clangula clangula*, Goldeneye Duck (118)
- 7 *Mergus albellus*, Smew (119)
- 8 *Mergus serrator serrator*, Redbreasted Merganser (122)
- 9 *Oxyura leucocephala*, Whiteheaded Stiff-tailed Duck (123)

COLOUR PLATES

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Plate 10, facing page 192

G. M. HENRY

- 1 *Accipiter gentilis schwedowi*, Goshawk (136)
- 2 *Accipiter nisus melaschistos*, Indian Sparrow-Hawk (148)
- 3 *Accipiter virgatus besra*, Besra Sparrow-Hawk (151)
- 4 *Milvus milvus milvus*, Red Kite (131)
- 5 *Hieraastur pennatus*, Booted Hawk-Eagle (164)
- 6 *Pernis ptilorhyncus ruficollis*, Crested Honey Buzzard (130)
- 7 *Buteo rufinus rufinus*, Longlegged Buzzard (153)
- 8 *Buteo buteo burmanicus*, Buzzard (156)
- 9 *Buteo hemilasius*, Upland Buzzard (154)
- 10 *Circus macrourus*, Pale Harrier (190)
- 11 *Circus aeruginosus aeruginosus*, Marsh Harrier (193)

Plate 11, facing page 208

A. M. HUGHES

- 1 *Butastur teesa*, White-eyed Buzzard-Eagle (157)
- 2 *Butastur liventer*, Rufouswinged Buzzard-Eagle (SE)
- 3 *Ichthyophaga nana plumbea*, Himalayan Greyheaded Fishing Eagle (177)
- 4 *Haliaeetus leucoryphus*, Pallas's Fishing Eagle (174)
- 5 *Milvus migrans govinda*, Pariah Kite (133)
- 6 *Haliastur indus indus*, Brahminy Kite (135)
- 7 *Elanus caeruleus vociferus*, Blackwinged Kite (124)
- 8 *Accipiter badius poliopsis*, Shikra (140)
- 9 *Aviceda leuphotes leuphotes*, Indian Blackcrested Baza (127)
- 10 *Circus melanoleucos*, Pied Harrier (192)

Plate 12, facing page 224

A. M. HUGHES

- 1 *Pandion haliaetus haliaetus*, Osprey (203)
- 2 *Accipiter trivirgatus indicus*, Crested Goshawk (144)
- 3 *Falco peregrinus peregrinator*, Shaheen Falcon (211)
- 4 *Microhierax caerulescens (burmanicus)*, Redbreasted Falconet (204 RE)
- 5 *Falco tinnunculus interstinctus*, Kestrel (223)
- 6 *Spilornis cheela burmanicus*, Crested Serpent Eagle (199)
- 7 *Lophotriorchis kienerii kienerii*, Rufousbellied Hawk-Eagle (165)

Plate 13, facing page 240

D. V. COWEN

- 1 *Ninox scutulata hirsuta*, Brown Hawk-Owl (644)
- 2 *Falco peregrinus peregrinator*, Shaheen Falcon (211)
- 3 *Aviceda jerdoni ceylonensis*, Legge's Baza (126)
- 4 *Glauclidium radiatum malabaricum*, Jungle Owlet (637)
- 5 *Aviceda leuphotes leuphotes*, Indian Blackcrested Baza (127)
- 6 *Falco severus rufipedoides*, Indian Hobby (214)

Plate 14, facing page 256

G. M. HENRY

- 1 *Spizaetus (cirrhatus) limnaeetus*, Changeable Hawk-Eagle (160)
- 2 *Haliaeetus leucogaster*, Whitebellied Sea Eagle (173)
- 3 *Spizaetus nipalensis nipalensis*, Hodgson's Hawk-Eagle (158)
- 4 *Circus gallicus gallicus*, Short-toed Eagle (195)
- 5 *Aquila nipalensis nipalensis*, Steppe Eagle (169)
- 6 *Aquila clanga*, Greater Spotted Eagle (170)
- 7 *Aquila chrysaetos daphanea*, Golden Eagle (166)
- 8 *Aquila heliaca*, Imperial Eagle (167)

COLOUR PLATES

Plate 15, facing page 272

D. V. COWEN

- 1 *Lophotriorchis kienerii kienerii*, Rufousbellied Hawk-Eagle (165)
- 2 *Spilornis cheela melanotis*, Crested Serpent Eagle (197)
- 3 *Bubo nipalensis, nipalensis*, Forest Eagle-Owl (628)
- 4 *Spizaetus cirrhatus cirrhatus*, Crested Hawk-Eagle (161)
- 5 *Ichthyophaga ichthyaetus ichthyaetus*, Greyheaded Fishing Eagle (175)

Plate 16, facing page 288

A. M. HUGHES

- 1 *Buceros bicornis homtrai*, Great Pied Hornbill (776)
- 2 *Torgos calvus*, Black Vulture (178)
- 3 *Gyps indicus tenuirostris*, Longbilled Vulture (184)
- 4 *Grus antigone sharpii*, Sarus Crane (324)
- 5 *Pavo muticus spicifer*, Burmese Peafowl (312)
- 6 *Gyps bengalensis*, Indian Whitebacked Vulture (185)
- 7 *Argusianus argus*, Argus Pheasant (SE)

Plate 17, facing page 320

PAUL BARRUEL

- 1 *Phodilus badius saturatus*, Bay Owl (609)
- 2 *Bubo nipalensis nipalensis*, Forest Eagle-Owl (628)
- 3 *Otus backkamoena lettia*, Collard Scops Owl (623)
- 4 *Glaucidium brodiei brodiei*, Collared Pigmy Owlet (635)
- 5 *Hieraaetus fasciatus fasciatus*, Bonelli's Hawk-Eagle (163)
- 6 *Ichthyophaga malayensis perniger*, Black Eagle (172)
- 7 *Microhierax caerulescens*, Redbreasted Falconet (204)

Plate 18, facing page 336

G. M. HENRY

- 1 *Falco subbuteo centralasiae*, Hobby (213)
- 2 *Microhierax melanoleucos*, Whitelegged Falconet (205)
- 3 *Falco vespertinus amurensis*, Redlegged Falcon (220)
- 4 *Falco chicquera chicquera*, Redheaded Merlin (219)
- 5 *Falco biarmicus jugger*, Laggar Falcon (208)
- 6 *Falco columbarius insignis*, Merlin (217)
- 7 *Falco naumanni pekinensis*, Lesser Kestrel (221)

ADDENDA

Three references to coloured plates have been omitted: The White Pelican (*Pelecanus onocrotalus*, No. 20) is illustrated in Plate 6, fig. 1, facing page 112; the White-eyed Pochard (*Aythya nyroca*, No. 109) in Plate 1, fig. 8, facing page 16; and there is a second illustration of the Shaheen Falcon (*Falco p. peregrinator*, No. 211) in Plate 12, fig. 3, facing page 224.

INTRODUCTION

Good historical accounts of ornithology and ornithologists in India, chiefly since the beginning of the nineteenth century, and the more important contributions to the science up to the publication of the last volume of Stuart Baker in 1930 are chronicled progressively in the introductory portions of all the standard books on Indian ornithology of that period — Jerdon's *Birds of India*, and the two editions of the Fauna of British India series on *Birds*. They call for no more than a brief reference here. The first six decades of the nineteenth century, up till the publication of the former in 1862, were dominated by the virtual founders of Indian ornithology, T. C. Jerdon, Brian Hodgson and Edward Blyth; but this pioneering period was marked also by a number of other active field workers among whom deserving mention are Adams, Franklin, Hutton, McClelland, Sykes, Tickell, and Tytler in India, and Kelaart and Layard in Ceylon. *Birds of India* epitomizes the knowledge up to that date, based on the vast collections of Hodgson (chiefly from Nepal), and of Blyth and Jerdon themselves and their many protégés and correspondents, including the above named, in various parts of the Indian Peninsula. 'Jerdon' contains some excellent field notes on habits and ecology which is a refreshing feature for a period when the main accent was, understandably, on amassing large numbers of skins — often through the help of local shikaris — and classifying them. Some of these accounts, particularly relating to the rarer species, have not been added to or improved upon since, and as a whole they still remain the hard core of our knowledge of certain aspects of bird study. The book continued as the standard work on Indian ornithology for many years and is of considerable usefulness even today. Unfortunately it covers only a portion of our area, leaving out practically the whole of the present West Pakistan and Kashmir, as well as Assam, Manipur, East Pakistan, the Andaman and Nicobar islands, and Ceylon. Nevertheless the appearance of such a handy comprehensive manual embodying all the hitherto more or less scattered and region-wise information available only in learned journals — such as *Proceedings of the Zoological Society* of London, and the journals of the Linnaean and Asiatic Societies — at once gave a marked impetus to bird study. It found new devotees who in turn were soon to become prominent names in Indian ornithology. The period thence, and right up to the publication of the first edition of the government-sponsored Fauna of British India series on *Birds*¹ was completely dominated by A. O. Hume, who had meanwhile appeared on the scene. Hume,

¹ Vols. 1 (1889) and 2 (1890) by Eugene W. Oates under the editorship of W. T. Blanford, Vols. 3 (1895) and 4 (1898) by Blanford himself.

who by the way is memorable also as being one of the founders of the Indian National Congress while still in active civil service, was a truly remarkable man. He has with good justification been called 'The Father' — and as a dubious compliment by those who were sometimes irked by his seeming dogmatism 'the Pope' — of Indian ornithology. Hume collected methodically and very intensively himself and with the help of his numerous band of competent colleagues and protégés and correspondents widely scattered over the country, chiefly between about 1870 and 1885. His collection totalled over 60,000 bird skins and large numbers of nests and eggs, all of which he later presented to the British Museum, where a large part of Hodgson's Nepal collection of over 20,000 skins had already found its way. Little wonder then that, together with the other vast collections such as those of Col. Sykes, the Marquis of Tweeddale (Viscount Walden), Mr John Gould, and the many others continually acquired since, the British Museum collection of Indian birds has come to be the most complete to be found under a single roof anywhere in the world.

Hume founded and edited '*Stray Feathers*' — *A journal of ornithology for India and dependencies* between 1872 and 1888. Its eleven volumes are a veritable gold-mine for the ornithologist and an eloquent memorial to the zeal, industry and erudition of their editor who by constant goading, advice and encouragement so ably contrived to get the best out of his tentacular band of correspondents and collaborators. The most notable of these were Anderson, Ball, Barnes, Beavan, Biddulph, Blanford, Brooks, Davison, Godwin-Austen, Hutton, Legge, Mandelli, McMaster, Oates, Scully, Sharpe, Stoliczka, Tweeddale, Vidal, Wardlaw-Ramsay, and others.

For the serious worker in Indian ornithology, *Stray Feathers* is an absolutely indispensable source. During the period of its existence this journal was the principal repository of the most important papers on Indian birds. When it ceased publication, after December 1888, many of its former contributors, as well as other workers who had gained prominence meanwhile, diverted their writings to *The Ibis* — the journal of the British Ornithologists' Union, and to the *Journal of the Bombay Natural History Society*. The last, which made its initial appearance in January 1886, has maintained unbroken publication since then. It has become increasingly important as a medium for disseminating knowledge of Indian birds and is now in its 65th volume. The *Journal* has grown progressively in international reputation and scientific stature since the turn of the century, and it is true to say that no work on Indian ornithology can be complete, or is indeed possible, without constant delving into its contents. Many significant contributions on birds have appeared in the pages of the *Journal* during the last 60 years. Even up to as recently as 1925 almost all the writers have been British — chiefly Government officials from all

branches of the services — Army, Police, Civil, Forest, and others— with a sprinkling of business and professional men. The more prominent of these have already been named in the introductory chapters of the Fauna, 2nd edition. Many of them continued to make significant contributions in the years subsequent to the completion of that work in 1930. This chronicle takes up the thread chiefly from that period on.

Bird study in India had received its second great boost by the publication between 1889 and 1898 of the four bird volumes by Eugene W. Oates and W. T. Blanford in the Fauna of British India series. As in the case of its predecessor, Jerdon's *Birds of India*, it brought together and up to date all the advances in knowledge due to the extensive work in the field and in the museum during the intervening twenty-seven years, from scattered sources including the most important — Hume's *Stray Feathers*. It took count of the areas omitted from Jerdon's manual, together with Burma, thus covering the entire British Indian Empire as it then stood, with the addition — on biological considerations — also of Ceylon. The inclusion of the extra territory increased the number of species described by more than half, and with the replacement of Jerdon's archaic nomenclature and obsolete system of classification by the more rational and progressive one that had since emerged from the anatomical researches of men like Huxley, Garrod, and Forbes, the Fauna gave a new look to Indian ornithology. It represented a marked improvement over its predecessor in every sense but one. Owing to limitations of space it was unhappily deemed fit to curtail drastically the descriptions of habits, migration etc. or omit them altogether, thus reducing very considerably the appeal and usefulness of the publication for the non-technical bird lover. This was a distinctly retrograde step.

Nevertheless the renewed fillip that the volumes gave to Indian bird study was clearly responsible for the eruption of the notable crop of outstanding field ornithologists that distinguished the next thirty-three years up to the publication of Vol. 1 of the 'New Fauna', including its author E. C. Stuart Baker himself.

A feature of the period between the two World Wars, and more particularly since the end of the Second, is the increasing popularity enjoyed by bird watching and field study as discrete from specimen collecting. This may be said to have given a new dimension to the study of Indian birds. The development and perfection of precision instruments such as field-glasses, cameras, and telephoto lenses, fast films, colour photography and sound recording have contributed not a little to this. They have helped to produce an ever-widening circle of competent bird watchers whose photographic records and penetrating observations of habits and nidification have added immensely to our knowledge, not only of the ecology but also of the systematics of Indian birds.

Thus, one of the more refreshing features of the 2nd edition of the *Fauna* by Stuart Baker (the 'New Fauna' for short) is the section on habits under each bird, in addition to fuller notes on nidification than in its predecessor. To Baker must also go the credit for introducing trinomials, officially as it were, into Indian ornithology although this system had been increasingly in vogue in Europe for almost two decades previously, and especially since the publication of Ernst Hartert's great work *Die Vögel der paläarktischen Fauna* began in 1910.

With the innovation of trinomials in Indian ornithology, a certain amount of disagreement and conflict of opinion was inevitable among ornithologists who had concerned themselves specially with its related problems; and indeed controversies have not ceased forty years after its introduction. No sooner was the first volume of the *New Fauna* published (in 1922) than the criticisms and arguments began. Whistler and Ticehurst in particular joined issue with Baker on a number of his statements and dicta. Many of their objections derived from the fact that large tracts of the country had as yet not been sufficiently explored ornithologically and there remained considerable gaps in our knowledge of the geographical distribution of many 'resident' birds — knowledge which is crucial for a proper application of the subspecies concept.

Nevertheless it must be conceded that by and large the *New Fauna* represented a distinct advance on its predecessors, though here and there it might suffer from obvious defects and inaccuracies of fact and geography. Among the many workers on Indian birds prominent during the period between the two World Wars (c. 1917 to 1943), and the years that followed, perhaps the most significant were E. C. Stuart Baker, Hugh Whistler, Dr Claud B. Ticehurst, Sir Norman Kinnear, Frank Ludlow, B. B. Osmaston, A. E. Jones, Charles M. Inglis, Sálím Ali, W. W. A. Phillips, R. S. P. Bates, and E. H. N. Lowther.

Besides these there are numerous others who made important contributions to Indian ornithology and whose names constantly recur in the *Journal of the Bombay Natural History Society* and other scientific periodicals. Foremost among them all must certainly rank Hugh Whistler, who had not only collected birds diligently during his seventeen years in the Imperial Police Service in the Punjab, but also amassed copious notes on every aspect of Indian bird life. These data were intended for a handbook of Indian birds which he and his close friend and collaborator Dr Ticehurst had commenced to write jointly. It was indeed a tragic blow for Indian ornithology when both these men — two of the most meticulous workers we have ever had — died before the manuscript had made much progress, Ticehurst in 1941 and Whistler in 1943.¹ A portion of Whistler's manuscript notes and

¹ Obituaries CBT, *Ibis* 1941: 321; HW, *Ibis* 1943: 524.

files, relating particularly to the Passeres, passed into the hands of one of us (SA) through the friendly offices of the Honourable Mrs Joan Whistler. This material will be of the greatest usefulness when that section of the present *Handbook* is reached. It has proved invaluable to the second author (SDR) in the preparation of his *Synopsis* which forms the groundwork of this book.

It was in order to rectify the deficiencies in our knowledge, chiefly of geographical distribution within the country pin-pointed by the publication of the new Fauna, that, at the instigation of Whistler, the Bombay Natural History Society with the financial sponsorship of Mr Arthur Vernay — an American business magnate and patron of Natural History — undertook, in 1929, a well-planned survey of the birds of the Eastern Ghats, at that time one of the least known areas in the Peninsula. The extensive survey collections, most excellently prepared by V. S. Lapersonne, the Society's field collector, were studied in England by Messrs Whistler and Kinnear with the collaboration of Dr Ticehurst. The scientific report of the Eastern Ghats Survey, in sixteen parts spread over several volumes of the *Journal* of the Bombay Natural History Society, graphically highlighted the gaps in our knowledge and supplied the incentive for a series of similar investigations in other poorly known parts of the country. These later surveys covered Jodhpur, Hyderabad, Travancore, Cochin, Gwalior, Indore, Bhopal, Mysore, Bahawalpur, Gujarat, Kutch, Bastar and Kankar (eastern Madhya Pradesh), and Orissa, in that order. All the field work, except in Jodhpur, was carried out by Sálím Ali chiefly with funds donated by the rulers of the States concerned and others, and supplemented from his own resources — and in close liaison with Hugh Whistler up to the time of the latter's death. The then newly introduced air mail service between India and the U.K. enabled running contact to be maintained from the field, and the rapid exchanges proved invaluable in the elucidation of many problems that required prompt collection of material and ancillary data. This close coordination between field and museum greatly enhanced the scientific worth of the surveys. Besides, Sálím Ali being more particularly interested in the *living* bird, devoted special attention to ecology and habits, and was able to accumulate a considerable amount of new data on these aspects in the course of his field work, adding substantially to what was recorded before. The late Dato Loke Wan Tho of Malaya, an exceptionally keen ornithologist and generous patron of ornithology, financed a bird survey of Sikkim during three separate field seasons between 1955 and 1957. The field work was again carried out by Sálím Ali, once with the active participation of Loke himself, and resulted in the publication by the former of the book *Birds of Sikkim* (1962). A few years earlier, in 1948, Loke had also made it financially possible for Sálím Ali to undertake a joint ornithological expedition to

the Mishmi Hills of north-east Assam (now Luhit Frontier Division, NEFA) with S. Dillon Ripley, the results of which were reported in the JBNHS (1948, 48: 1-37). Incidentally it was on the Mishmi expedition that the idea of the present Handbook was first mooted between the authors. All these newly accumulated data soon made it plain that Stuart Baker's Fauna left much room for correction, addition and improvement in many respects, and emphasized the need for an early revision. Added to all the wealth of material procured by these regional bird surveys, mention must be made of the very fruitful collecting expeditions of Ripley himself in Nepal, and the Naga Hills of Assam (now Nagaland), during the post-war years. Further, during the war period Ripley had found opportunities for selective collecting in Ceylon while on duty with the American armed forces in that island, thus supplementing the excellent work zealously carried on there by W. W. A. Phillips over a long series of years. A major contribution to bird collections from India was made by another American, Walter Koelz, during an extended sojourn of some fourteen years (c. 1939-53) in the subcontinent and neighbouring countries. While collecting specimens of grains on behalf of the U.S. Department of Agriculture, he managed also to amass a stupendous collection of some 40,000 bird skins — partly in Iran and Afghanistan, but mainly in Pakistan, Nepal, Assam, and various other insufficiently worked areas of the Indian Subregion. Koelz was an indefatigable field collector. By dint of unsparing effort and fanatical industry he managed to procure large series of many birds poorly represented even in the foremost world collections, including some of the rarest forms. Unfortunately he does not seem to have kept field notes on habits, ecology, etc. He certainly never published any, nor have we been privileged to see them in MS. — thus depriving Indian ornithology of what could undoubtedly have been his greatest contribution to it. Unfortunately also the vast Koelz collection was broken up and dispersed among a number of museums in the U.S.A., a circumstance which has deprived students of the convenience of having all this material available for study in one central institution.

* * * *

The standard manuals of ornithology mentioned earlier were excellent in their own way, but they presumed a basic familiarity with birds and were difficult to use by the uninitiated layman. Besides, it was widely realized that now — over thirty years since their publication — Stuart Baker's Fauna volumes were outmoded in many respects and stood in urgent need of revision. What was obviously needed at this stage was not merely the Fauna in its old format brought up to date, but a work which combined strict scientific accuracy with non-technical language and popular appeal — concise accounts of life history and habits and,

above all, good coloured illustrations supplemented by simple clues to field identification. Since the change in the political set-up in India (in 1947) and the departure of British officials, among whom were to be found some of the keenest and most knowledgeable bird-watchers, field activity suffered a noticeable setback. A serious impediment to the development of scientific ornithology in India, where bird-watching as a hobby has never been very popular even among the more affluent and educated classes, was certainly the lack of illustrated literature on the birds of the country. The stimulus given to purposeful bird-watching as a first step to deeper study by the publication in recent years of illustrated books like Whistler's *Popular Handbook of Indian Birds* and Sálim Ali's *Book of Indian Birds* clearly pointed to the need of a more comprehensive work on the same lines.

Our inspiration was derived from the admirable *Handbook of British Birds* by Witherby and others, which combines all the desired features in a manner that has seldom been excelled. But though our book is so entitled as a tribute to its British original, we are only too conscious of the loss it suffers by comparison since our information on most topics of the life history and ecology of Indian birds — even of distribution — is as yet quite elementary compared with that in the British handbook. Nevertheless it seems desirable to record whatever is known if only to show the extent of its incompleteness, so that the deficiencies may in time be rectified.

The first essential, before a beginning with such a book could be made, was an up-to-date checklist as basis for the descriptive volumes to follow, a need admirably fulfilled by Ripley's *A Synopsis of the Birds of India and Pakistan* published by the Bombay Natural History Society in 1961. It lists some 1,200 species in nearly 2,100 forms within the above limits, with which is also included Ceylon from biological considerations.

In the past the greater part of the ornithological work in India consisted of specimen or egg collecting, sometimes rather haphazardly. Within recent years these activities have been increasingly replaced by bird-watching at various levels of scientific competence. Most of the observers have been government officials or tea, coffee or rubber planters, fortuitously stationed for varying periods in different parts of the country. Few of them possessed any formal biological background, and though a number contributed substantially to our knowledge such were, for the size of the country, too few and far between. For us — the present authors — difficulty lay in assessing the authenticity of the distributional and other records by observers of unproved competence in field identification especially where they rested solely on sight, or related to topics of a controversial nature. There is no doubt that in the past many unwarranted records and observations have been uncritically accepted in this way. The need

for caution has doubled in recent years because of the expanding circle of casual bird-watchers of vastly divergent expertness, and the decline in the vogue of shooting specimens to support identification. Thus it is possible that in exercising our judgement in this regard we may sometimes have erred on the side of overcaution.

Even after suitable compression of the available data, meagre as they are on the whole, a coverage of this magnitude is estimated to require 10 volumes of approximately 400 pages each, and many years to complete. Such a work must inevitably be a compilation to a large extent, collating our own notes with the sifted publications and MSS. of a large number of field observers and museum workers. In view of the coloured illustrations, 'feather by feather' descriptions of plumages, as in the Fauna, were considered redundant. The pictures, supplemented by the Keys and the paragraphs on Field Characters and Museum Diagnosis, should suffice to identify a bird in the field as well as in the hand.

The New Fauna has already listed active workers in Indian ornithology up to the time of its completion in 1930; that account now merely needs carrying forward to the publication of the present volume. In addition to the persons named below there are others who have made minor but significant contributions and who will appear in the text. During the progress of these volumes it is hoped that further names will also need to be added. The major continuing contributors as well as new ones since the completion of the second edition of the Fauna have been Humayun Abdulali, Sálím Ali, E. C. Stuart Baker, R. S. P. Bates, F. N. Betts, Biswamoy Biswas, F. S. Briggs, P. T. L. Dodsworth, E. A. D'Abreu, R. S. Dharmakumarsinhji, C. H. Donald, K. R. Eates, R. L. Fleming (Sr.), J. C. Higgins, Charles M. Inglis, A. E. Jones, N. B. Kinnear, Walter Koelz, Satya Churn Law, Loke Wan Tho, E. H. N. Lowther, Frank Ludlow, R. Meinertzhagen, B. B. Osmaston, W. W. A. Phillips, Mrs Desirée Proud, S. Dillon Ripley, Claud B. Ticehurst, H. W. Waite and Hugh Whistler. Foremost among those active in Burma up to the time of its fall to the Japanese invaders in the war (1941) were P. F. Garthwaite, T. R. Livesey, H. C. Smith, B. E. Smythies, and J. K. Stanford. Since the end of hostilities little work seems to have been done in that country, or since the partition (1947) in Pakistan.

ACKNOWLEDGEMENTS

To all the above and the many more on whom we have drawn freely we feel greatly beholden. Particular mention must be made of Dr Biswamoy Biswas who has been associated with the preparation of the MS. in various ways and whose critical comments and suggestions on various matters have always been most valuable.

We have to express our indebtedness to the National Institute of Sciences of India and its then President, the late Dr Sunder Lal Hora, for the award of a Research Fellowship to one of us (SA) for two years (1952-3) to forward the extraction of relevant material from the literature. The Bombay Natural History Society, under whose sponsorship this book is being produced, has provided facilities at every stage, especially the use of its excellent collection of Indian bird skins and ornithological library. We wish to express our appreciation of the unfailing cooperation we have received from its staff at all times.

Without the substantial grant-in-aid from the Government of India, Ministry of Scientific Research, for the preparation of the four-colour blocks, and for secretarial assistance to one of us (SA) in preparing the MS., it is doubtful if such an ambitious project could have been entertained or carried through. Likewise would it have been impossible to find the foreign exchange needed for payment of the artists' fees, since most of these are of necessity European, but for the generous underwriting by friends in the United States of America of the substantial amount needed for the purpose.

The dichotomous keys to genera, species, and subspecies have been constructed by one of us (SDR) with the most valuable aid of his research assistant Mr Gorman M. Bond, Museum Specialist of the Smithsonian Institution, Washington, to whom warm thanks are due. We are indebted to Mr Bertram E. Smythies and Messrs Oliver & Boyd Ltd, the author and publishers respectively of *The Birds of Burma*, for their generous permission to use a number of the coloured plates painted for that book by Commander A. M. Hughes. A few of the figures on these depict a different subspecies to that found within Indian limits, but the differences are mostly minor enough to be reconciled by a short verbal correction. We have been similarly privileged to use the coloured plates from *The Birds of Travancore and Cochin* (now *Birds of Kerala*) and *The Birds of Sikkim* by courtesy of the sponsors of those books, the University of Kerala and the Government of Sikkim respectively, and of the publishers, the Oxford University Press.

Most of the line drawings in the text are the same as appeared in the first edition of the *Fauna of British India: Birds*, and again in the second edition of that work by E. C. Stuart Baker (Taylor & Francis, for the Government of India). In addition, Messrs H. F. & G. Witherby have generously permitted us to reproduce some of the very useful text figures from their *Handbook of British Birds*. All this considerate cooperation has not only helped to cut down costs, especially of painting the extra coloured plates and block-making, but also resulted in a considerable saving of time.

The distribution maps have been constructed or adapted from a number of different sources the chief of which are *Atlas of European*

Birds by K. H. Voous (Nelson), *Waterfowl of the World* by Jean Delacour (Country Life), and *Birds of the Soviet Union* by G. P. Dementiev, H. Gladkov *et al.*

Lastly, our particular and grateful appreciation is due to the staff of the Oxford University Press. But for their running bombardment of queries and suggestions many more inaccuracies, inconsistencies and ambiguities would have persisted in this volume than the reader is perhaps still likely to discover.

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GENERAL

ORNITHOLOGISTS conditioned to the sequence of Orders and Families in Stuart Baker's Fauna volumes may experience some initial inconvenience and confusion by the arrangement in the present handbook. In the main this represents the scheme proposed by Wetmore (*Proc. U.S. Nat. Museum*, 76, Art. 24, 1930, pp. 1-8) now used more or less internationally with minor shufflings chiefly in the Passeriform ('Song bird') families. This system was formally introduced into Indian ornithology by the publication in 1961 of *A Synopsis of the Birds of India and Pakistan* by S. Dillon Ripley, our latest authentic checklist, which virtually forms the index volume and basis of the present work. Superficially this system is little more than the old one in reverse. Whereas the Fauna began with the Order Passeriformes as containing the putatively highest developed forms and worked down to the lowest, namely to the Gaviiformes (Loons and Divers), we now begin at the bottom of the evolutionary tree and work up to the highest evolved forms.

The sequence of Orders and Families in the *Synopsis*, which will be followed in this work, is as under :

Volume 1 (Nos. 1-224)

Order GAVIIFORMES

Family Gaviidae : Divers, Loons

Order PODICIPEDIFORMES

Family Podicipedidae : Grebes

Order PROCELLARIIFORMES

Family Procellariidae : Petrels, Shearwaters

Hydrobatidae : Storm Petrels

Order PELECANIFORMES

Family Phaethontidae : Tropic-birds

Pelecanidae : Pelicans

Sulidae : Boobies

Phalacrocoracidae : Cormorants and Darters

Fregatidae : Frigate Birds

Order CICONIIFORMES

Family Ardeidae : Herons, Egrets, Bitterns

Ciconiidae : Storks

Threskiornithidae : Ibises, Spoonbill

Phoenicopteridae : Flamingos

Order ANSERIFORMES

Family Anatidae : Ducks, Geese, Swans

Order FALCONIFORMES

Family Accipitridae : Hawks, Vultures, etc.

Falconidae : Falcons

Volume 2 (Nos. 225-434)**Order GALLIFORMES**

Family Megapodiidae: Megapodes

Phasianidae: Pheasants, Partridges, Quails

Order GRUIFORMES

Family Turnicidae: Button and Bustard-Quails

Gruidae: Cranes

Heliornithidae: Finfoot

Otididae: Bustards

Order CHARADRIIFORMES

Family Jaçanidae: Jaçanas

Haematopodidae: Oystercatchers

Charadriidae:

Subfamily Charadriinae: Plovers

Scolopacinae: Curlews, Sandpipers, Snipe, Woodcock

Phalaropinae: Phalaropes

Family Rostratulidae: Painted Snipe

Recurvirostridae: Stilts, Avocets

Dromadidae: Crab Plover

Volume 3 (Nos. 435-665)

Family Burhinidae: Stone Curlews, Thick-knees

Glareolidae: Coursers, Pratincoles

Stercorariidae: Skuas, Jaegers

Laridae: Gulls, Terns

Order COLUMBIFORMES

Family Pteroclididae: Sandgrouse

Columbidae: Pigeons, Doves

Order PSITTACIFORMES

Family Psittacidae: Parrots

Order CUCULIFORMES

Family Cuculidae: Cuckoos

Order STRIGIFORMES

Family Strigidae:

Subfamily Tytoninae: Barn Owls

Striginae: Owls

Volume 4 (Nos. 666-871)**Order CAPRIMULGIFORMES**

Family Podargidae: Frogmouths

Caprimulgidae: Nightjars or Goatsuckers

Order APODIFORMES

Family Apodidae:

Subfamily Apodinae: Swifts

Hemiprocninae: Crested Swifts

Order TROGONIFORMES

Family Trogonidae: Trogons

Order CORACIIFORMES

Family Alcedinidae: Kingfishers

Meropidae: Bee-eaters

Coraciidae: Rollers

Upupidae: Hoopoes

Bucerotidae: Hornbills

Order PICIFORMES

Family Capitonidae: Barbets

Indicatoridae: Honeyguides

Picidae: Woodpeckers

Order PASSERIFORMES

Family Eurylaimidae: Broadbills

Pittidae: Pittas

Volume 5 (Nos. 872-1063)

Family Alaudidae: Larks

Hirundinidae: Swallows

Laniidae: Shrikes

Oriolidae: Orioles

Dicruridae: Drongos

Artamidae: Wood Swallows or Swallow-Shrikes

Sturnidae: Starlings

Corvidae: Jays, Magpies, Crows

Bombycillidae:

Subfamily Bombycillinae: Waxwings

Hypocoliinae: Hypocolius

Volume 6 (Nos. 1064-1271)

Family Campephagidae: Cuckoo-Shrikes, Minivets

Irenidae: Fairy Bluebirds, Ioras, Leaf Birds

Pycnonotidae: Bulbuls

Muscicapidae:

Subfamily Timaliinae: Babblers (part)

Volume 7 (Nos. 1272-1473)

Family Muscicapidae (cont.):

Subfamily Timaliinae: Babblers (cont.)

Muscicapinae: Flycatchers

Pachycephalinae: Shrikebilled Flycatchers

Volume 8 (Nos. 1474–1680)

Family Muscicapidae (cont.):

Subfamily Sylviinae: Warblers

Turdinae: Thrushes, Chats

Family Troglodytidae: Wrens

Volume 9 (Nos. 1681–1891)

Family Cinclidae: Dippers

Prunellidae: Accentors

Paridae:

Subfamily Parinae: True Titmice

Remizinae: Penduline Titmice

Aegithalinae: Longtailed Titmice

Family Sittidae:

Subfamily Sittinae: Nuthatches

Tichodromadinae: Wall Creeper

Salpornitinae: Grey Creeper

Family Certhiidae: Tree Creepers

Motacillidae: Pipits, Wagtails

Volume 10 (Nos. 1892–2060)

Family Dicaeidae: Flowerpeckers

Nectariniidae: Sunbirds

Zosteropidae: White-eyes

Ploceidae:

Subfamily Passerinae: House or Rock Sparrows

Ploceinae: Weaver Birds

Estrildinae: Waxbills, Avadavats

Family Fringillidae:

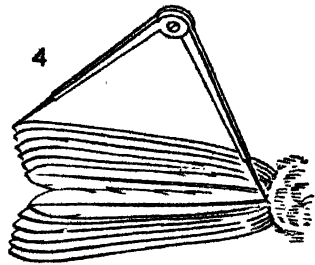
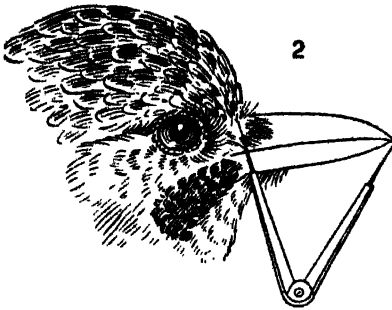
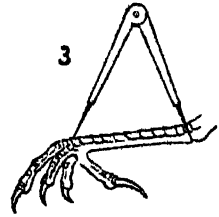
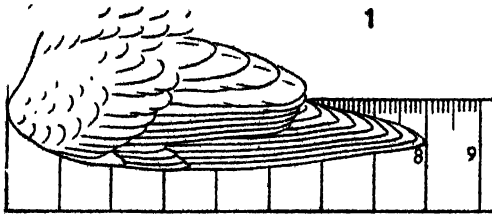
Subfamily Fringillinae: Chaffinches

Carduelinae: Goldfinches and allies

Family Emberizidae: Buntings

Measurements. At the head of each description, before **FIELD CHARACTERS**, is given an indication of **SIZE**, first as compared with some well-known and familiar bird (the signs + and – denoting larger or smaller than, and ± more or less equal to), and then by length in centimetres and inches. This refers to the length from tip of bill to tip of tail of a freshly killed bird laid on its back, unstretched, or of a similarly made up museum skin. This measure is purely as a matter of convenience in field identification since it is easy enough for anyone to hold his two hands apart and visualize what ‘about 15 cm. or 6 inches’ means. It has no scientific value.

Under **MUSEUM DIAGNOSIS** the measurements given for wing, bill, tarsus, and tail are those taken by the standard methods as shown in



STANDARD METHOD OF MEASURING BIRDS

- 1 *Wing* Pressed out on the rule until it is quite flat, giving the longest measurement obtainable. For very large birds (e.g. eagles and swans), a measuring tape is stretched from the carpal joint to the longest feather along the upper side of the wing. This is known as the chord measurement.
- 2 *Bill* From skull. One end of the dividers is slid along the culmen and pressed to the skull, which is usually concealed by feathers. This gives a more consistent measurement than from the end of feathering to the tip ('culmen' or 'bill from feathers').
- 3 *Tarsus* One end of the dividers is pressed to the tibiotarsal or 'knee' joint, the other passed to the joint at the base of the middle toe.
- 4 *Tail* One end of the dividers is slid between the central tail feathers and pressed to the body while the other is passed to the tip of the longest feather.

the Explanatory Figures. It must be mentioned, however, that in all of Stuart Baker's measurements quoted from the Fauna, the bill has been measured from the *forehead feathers* to the tip (i.e. culmen), and not from the *skull* as is now the accepted practice. Wing measurement in particular can be more satisfactorily taken in the flesh — either on a freshly killed bird or a living one — while the joints are still flexible and easy to manipulate. There is some slight shrinkage on drying which can largely be compensated for by not pressing and

straightening out the fresh wing on the rule too much (as when measuring a dry skin) but merely leaving it in a fully extended natural position. This precaution is necessary in order to make the wing comparable with dry museum skins later.

Weight. Field collectors have paid little attention to this detail in the past except perhaps in the case of some game birds. Apart from being a record of sexual differences in many species, fluctuations in weight due to seasonal physiological changes and deposition of body fat have an important bearing for the study of bird migration; therefore, wherever possible weights should be accurately recorded. With small birds like most passerines this is easily done by slipping the bird, dead or alive, into a plastic bag and hooking it on to a suitable spring balance, the tare having been previously ascertained. With large live birds some device to prevent them from fluttering during weighment is necessary.

NOTE. Much of our information relating to nesting has been culled from Stuart Baker, either from FBI or from his *Nidification of Birds of the Indian Empire*. Though these are authentic sources by and large, it needs to be emphasized that some of this author's data concerning clutch sizes, and even his identifications of certain eggs, are suspect or demonstrably erroneous. Baker, although an experienced oologist himself, often collected his eggs and information vicariously with the help of local shikaris and hired jungle people, or purchased them in lots from minor professional collectors whose testimony was not always dependable. Therefore any of his published data that differ widely from those of other workers or from personal experience must be treated with caution since they are more than likely to have been vitiated in this manner. Every effort has here been made to weed out all palpably doubtful records.

MIGRATION

THE 2100 odd species and subspecies of birds that comprise the avifauna of the Indian subcontinent and Ceylon include land birds as well as pelagic forms such as petrels, shearwaters, frigate birds, boobies, and skuas normally found only out at sea but which get blown in sporadically on our seaboard during heavy monsoon gales. Roughly about 350 forms are extralimital seasonal immigrants, meaning that they breed outside our territory, mostly in the Palaearctic Region beyond the Himalayas — in central and northern Asia, and eastern and northern Europe. The most abundant and regular winter migrants are the ducks and geese (*Anatidae*), Wading or Shore birds (*Charadriidae*) especially of the subfamilies *Charadriinae* and *Scolopacinae*, Cranes (*Gruidae*), and the passerine families *Hirundinidae* (Swallows), *Muscicapidae* especially *Muscicapinae* (Flycatchers), *Sylviinae* (Warblers), *Turdinae* (Thrushes and Chats), *Motacillidae* (Pipits and Wagtails), *Fringillidae* (Finches), and *Emberizidae* (Buntings). But many other families are represented among the migrants as well. Moreover, every gradation of migration is met with, from local movements of no more than a few kilometres, or a few hundred metres altitudinally in the Himalayas or peninsular mountains, to enormous trans-Himalayan journeys involving several thousand kilometres each way.

Besides the large number of extralimital migrants, there are numerous others whose palaearctic breeding range just encroaches our boundaries on the Afghanistan-West Pakistan border, and also into Gilgit, Ladakh, Garhwal, Nepal, Sikkim, Bhutan, and NE. Assam. Many of these species spread over northern India in winter, and many over the rest of the Peninsula as well. In all respects they behave like the true migrants from beyond, arriving with them and spreading out over the country in autumn, chiefly between September and November, and leaving again for their northern breeding grounds before our hot weather commences in March/April. Considering the hundreds of species and the millions of individuals involved in these biannual journeys, year after year, it is amazing how little precise information we possess concerning the provenance, routes and goals, and other factual details of the migrants. Practically all that is known is based on somewhat scrappy and haphazard observations, chiefly of British army and civil service personnel who happened to be stationed along the strategic Indo-Afghan border within the last 100 years. Some of these men were excellent field naturalists and have contributed vastly to our basic knowledge of Indian ornithology. The names of Scully, Biddulph, the two Marshall brothers, Magrath, Whitehead

and Donald stand out from amongst the many others in this connexion. Their observational data, though primarily relating to sporting birds such as ducks, geese, and cranes, form the hard core of practically all that is known of trans-Himalayan bird migration. They outlined the broad pattern of the seasonal movements and indicated that the main migration route between Siberia and central Asia on the one hand and the Indian peninsula on the other was the Indus Valley in the northwest. Similar though even more fragmentary bits of information from the northeastern outposts of India suggest that from NE. Asia the Tsangpo or Brahmaputra river and its affluents constitute the principal flyway. The two migrational streams enter from either end of the Himalayan mountain chain in a pincer movement and converge on the tip of the Peninsula, weakening as they advance southward and trickle over into Ceylon which virtually forms the terminus. However, increasing evidence is being procured by mountaineers in recent years that migrants also fly directly across the Himalayas, even over some of the highest sections of the mountain barrier, thereby in effect shortening their journeys very considerably. Not only have many migrating geese, waders and passerine birds been visually recorded during daytime¹ and heard passing over the high altitude camps at night, but climbers have also come across remains of migratory birds such as ducks, cranes, waders, and eagles² strewn on high glaciers in the Himalayas and Karakorams which had evidently perished in storms and blizzards. At Dehra Dun geese have been observed through a telescope flying northward in spring at a height of c. 29,500 feet (8830 m.) across the face of the moon. Indeed there is now sufficient evidence of this kind to suggest that a far greater amount of passage must take place directly over the High Himalayas than had hitherto been credited. Recent migration studies by radar in Europe and America have shown that, contrary to older beliefs, even small passerine birds may travel at unsuspected heights of 6000 metres or more, which lends colour to this probability. Nevertheless it is true that a large proportion of the migratory birds, especially ducks and geese, that enter the subcontinent from the northwest in autumn — when the journey is more leisurely performed — sweep down the valley of the Indus river. One arm of the migrational tide branches off early in a SE. direction and debouches into the north Indian plains through Hazara, Kashmir, and the Punjab. The Kagan and Kurram Valleys on the northwest frontier of Pakistan have been specifically named in this connexion (Whitehead, Magrath). The other arm continues southward down the Indus and, avoiding the inhospitable expanse

¹ Biswas reports seeing a stray hoopoe (*Upupa epops*) on Pumori Glacier, c. 5790 m., in May.

² Blacktailed Godwit (*Limosa limosa*) and Pintail Duck (*Anas acuta*) on Khumbu Glacier c. 16,000 ft. (4875 m.) at the foot of Mt Everest, and Steppe Eagles (*Aquila nipalensis*) on South Col, c. 26,000 ft. (7925 m.).

of the Thar or Indian Desert to the east, veers further south in a southeasterly direction to cross the Great Rann of Kutch, northern Gujarat and Saurashtra and enter the Indian peninsula. This stream is augmented in its course by migrants travelling SSE. from W. Asia — from the Caspian-Aral region through Iran, Afghanistan, Baluchistan, and Lower Sind. This, in broad outline, is the general picture that emerges from a consideration of the data available. But it is largely conjectural and hypothetical and needs verifying by more intensive studies. There is reason to believe that for many species the pattern of the spring migration, which is usually more hurried and direct, with fewer stop-overs and also at higher altitudes, is very different. Kutch also lies on the extreme eastern fringe of a broad stream of through migration that sweeps down from central and northern Asia in a southwesterly direction in autumn. This current passes over Afghanistan and the former NW. Frontier Province, down through Baluchistan and Sind, then across the Arabian Sea and the tip of southern Arabia into Somalia, Abyssinia, and further south in the African continent. Such species as the Kashmir Roller (*Coracias garrulus semenowi*), European Nightjar (*Caprimulgus europaeus unwinii*), European and Bluecheeked Bee-eaters (*Merops apiaster* and *M. s. persicus*), Redbacked Shrike (*Lanius collurio*), Rock Thrush (*Monticola saxatilis*), Greybacked Chat (*Erythropygia galactotes familiaris*), Indian Whitethroat (*Sylvia communis icterops*), Spotted Flycatcher (*Muscicapa striata neumanni*), and others, travel regularly by this route. From the absence of Indian records on spring passage it is evident that most of them, at any rate, take a different route for the return journey north.

Far less is known about bird migration across our northeastern frontiers. This is largely due to the uninhabited, rugged and mostly inaccessible nature of the terrain in the eastern Himalayas, and to the fact of this frontier having been considered of too little strategic importance in the past to necessitate the stationing of British military personnel such as have provided most of our data for the northwest. The recent Chinese incursions in that quarter have dictated greater vigilance and logistic developments, and with the opening up of the North-east Frontier Agency tracts (NEFA) to 'civilizing' influences it is to be hoped that our knowledge of bird migration in that area will profit.

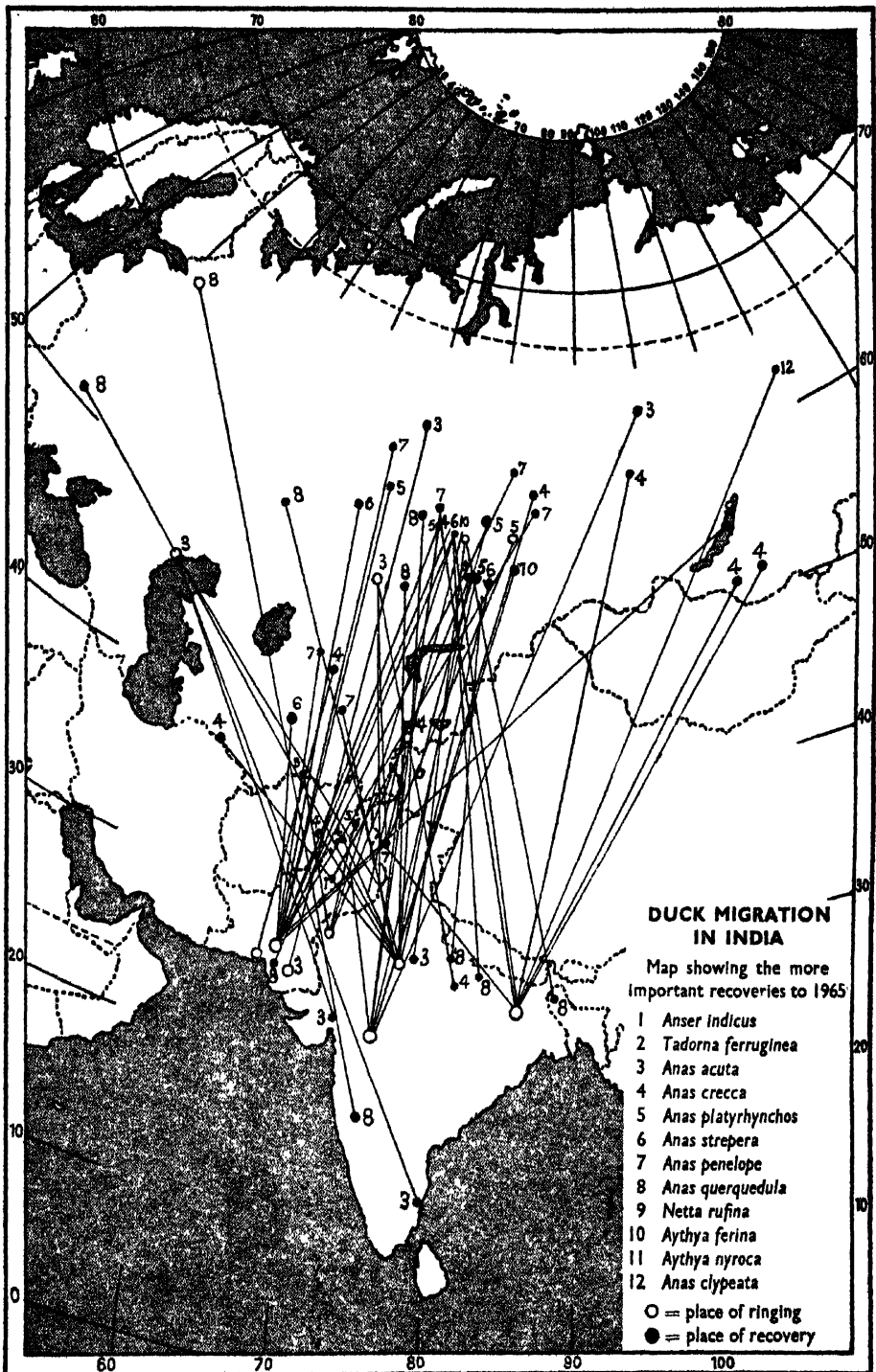
In so far as Ceylon is concerned there is some evidence for the presumption that not only do both the western and eastern arms of the palaearctic migration into the Indian peninsula cross over into the island, but also of a third route that brings NE. Asiatic migrants through Indochina and Thailand via the Andamans. So far, however, no direct proof of this has been provided by ring recoveries (Phillips 1956).

Our knowledge of Indian bird migration has so far consisted largely of fragmentary records, often of a subjective and conjectural nature.

The first attempt to rectify this deficiency was a modest scheme of bird-ringing initiated in 1926 by the Bombay Natural History Society with the active cooperation of the then Maharaja of Dhar (Sir Udajirao Puar) and the rulers of a few other Indian States, as well as some of the larger zamindars of Sind. Considering the meagreness and haphazard nature of that experiment, which virtually petered out by 1934 through lack of funds, the results proved unexpectedly gratifying. Those early ring recoveries constituted our first positive confirmation that most of our migratory ducks are in fact derived from Siberia and from central and northeastern Asia, often over distances of 3000 to 5000 km. and more. In addition to Indian-ringed birds recovered in the U.S.S.R., some highly significant recoveries of European-ringed birds in India were also obtained during the same period: a Green Sandpiper (*Tringa ochropus*) ringed near Moscow, in Kerala; a White Stork (*Ciconia ciconia*) ringed in western Germany, in Rajasthan; and a Rosy Pastor (*Sturnus roseus*) ringed in Hungary, in the Punjab.

It was not till the year 1960 that a more comprehensive project for bird-ringing in India became possible through the cooperation of various scientific organizations interested in the problem of possible dissemination of arthropod-borne viruses by migrating birds. During the seven years of operation of this scheme nearly a hundred thousand migratory birds have been ringed, chiefly wagtails (Motacillidae) and of several other passerine families, in addition to ducks (Anatidae) and waders (Charadriidae). So far all the work has been done departmentally by the Bombay Natural History Society in a few selected localities, but it is proposed to expand the programme with the cooperation of individual ornithologists and naturalists' associations into a coordinated network of ringing field stations giving the widest possible coverage over the subcontinent. The intensive ringing of migratory birds, combined with visual records and other data regularly maintained by competent observers and over prolonged periods of time, and supplemented by modern migration study techniques and mechanical devices such as radar, can alone provide an unequivocal picture of the situation in our area. Of all these, perhaps large-scale bird-ringing is the most immediately important.

The aluminium rings used by the Society are of several appropriate sizes. They bear the inscription INFORM BOMBAY NAT. HIST. SOCIETY together with a serial number prefixed by a letter of the alphabet denoting size. In order to coordinate all ringing activities in the subcontinent and minimize dissipation of effort and data, it is desirable that only the Bombay Natural History Society's rings should be used, as is being done in Ceylon. All recoveries, whether of these rings or foreign ones in India, should be reported (preferably accompanied by the actual ring) to the Society as the central organization



in this part of the world for ringing and maintaining records and furnishing up-to-date information.

Very little has been published on Indian bird migration, and that largely as haphazard parochial arrival and departure dates of random species in random parts of the country. Most of these records are scanty and irregular. They are, moreover, buried away among regional bird papers published from time to time chiefly in the *Journal of the Bombay Natural History Society* or *The Ibis*, and difficult to unearth and collate.

The map indicates the pattern of Anatid migration as revealed by the recoveries of ringed ducks in and from the subcontinent to date. This, in general, is the pattern gradually developing in the case of other palaearctic migrants as well, but it may be a long time before we have sufficient authentic data to deduce satisfactory specific conclusions. Details of a few significant recoveries will be found under the species concerned.

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ZOOGEOGRAPHY OF THE INDIAN SUBREGION

THE 'Oriental Region' (or Indian Region as he called it) was first proposed as one of the six zoogeographic regions of the world by Philip Lutley Sclater in 1858. His subdivisions were based on the study of birds for he was an ornithologist. In spite of the century of discussion and research that has ensued, his arrangement is still followed today. A more specific discussion of the zoogeography of India followed in the paper of Blanford (1901).

Broadly speaking the Oriental Region encompasses most of what is today known politically as India, excluding the higher reaches of the Himalayan mountains although the Oriental fauna and flora extend up to 11,000 feet in some cases (Ripley, 1961). Nepal, Ceylon and adjacent islands, East Pakistan, and large areas of southeast Asia are included in the Oriental Region.¹ West Pakistan is a much drier area and belongs to a transition zone of southern Eurasia, partly the Palaearctic Region so-called, with drier, more temperate climate, partly trending towards the hot dry Somali arid zone of Chapin (1932), as described for Arabia (Ripley, 1954).

In his excellent general book on zoogeography, Darlington (1957) has pointed out that the interpretation and study of the patterns of distribution of animals which makes the subject of zoogeography consists of a number of subpatterns. The first and broadest of these is *limitation*, the final limits of a species or a larger grouping—a genus or family or class of animal. Within geographical limits certain classes of animals exhibit roughly parallel distributions. The assembling and considering of the *limits* then to which cold-adapted or warm-adapted animals proceed, tends to bring into rough focus the concept of zoogeographical regions of the world. Thus the Oriental Region besides being a geographic part of the land and fresh waters of the world, has a certain limit imposed on it by climate and temperature within which groupings of animals find their preferred home.

A second subpattern is *zonation*, implying climate, and it is fundamental to the land divisions of the Oriental Region that it falls primarily within the tropical zone with fingers extending up into the mountains. Mountains of course in tropical latitudes serve as islands. By proceeding upwards and gaining altitude the tropical zone is lost gradually and at a steady rate. Gradually the subtropical, then the temperate zones are encountered, and finally at the greatest heights, the alpine zone may be reproduced as it were, duplicating conditions found in the tundras of the far north or the subantarctic.

¹ For a fuller account see Sâlim Ali 1964, Article 'Oriental Region' in Thomson, A. L. (ed.), *New Dict. Birds* (London & New York).

A third pattern is that of *geographical radiation*, of spreading outwards of a particular group of animals from some geographic centre. A powerful world centre for animal evolution has apparently been the old-world tropics so-called, the heartland of which is the Oriental Region. Thus in the case of birds, the dominant families of birds in India belong to what is sometimes called the 'Indochinese' fauna, the birds adapted to life in warm, moist tropical southeast Asia, birds primarily of jungle or heavy forest. The geographical ramifications of southeast Asia, the tangled patterns of mountain chains, river drainage systems and a long period of stable climate seem to have been ideal for the evolution of a wide array of species of birds.

A fourth subpattern is that of *differentiation of faunas*. Here in the tropics of the Oriental Region this is well illustrated in birds where there is great diversity. Over sixty per cent of all the endemic species of Indian birds (endemic meaning restricted to a particular place) are of the 'Indochinese' subregion so-called, confined to the Oriental Region.

Darlington's fifth subpattern is that of *concentration in the largest, most favourable areas*. Here again this phenomenon is well-illustrated in the response of the bird fauna of India which, being predominantly tropical, occurs in greatest concentration in the largest areas of rainfall in eastern India, East Pakistan, along the mountain chains wherever the monsoon shadow occurs, especially in southwest India, in parts of Ceylon and in the Andaman and Nicobar Islands.

Of all the zoogeographical regions of the world, perhaps the Oriental is the least limited by barriers, but at the same time it is one of the principal if not the principal one from the point of view of evolution and of having acted as a centre of dispersal. Only northern South America has a richer fauna, only tropical America, and some of the most isolated areas like New Zealand, have a higher rate in proportion of species formation and evolutionary response.

A brief review of geological origins may be appropriate here. In Permian times, more than two hundred million years ago, the peninsula of India and an inter-connected Ceylon, all the area south of the Ganges river basin, was part of a continental region. This massif is composed of ancient rocks which to the geologist are representative of a continent. These rocks are known as the Gondwana formation and the outlines of this ancient continent can be traced up to northwestern India on the west, towards Calcutta on the east, with the edges of marine sediments marking old coastlines, and old river beds emptying into areas of former seas. The special fossil shells of this rock show that the continent was rimmed by far cooler seas than today. What the continent of Gondwanaland consisted of may never be known, but there are clues from the presence of similar rock formations. It may have spread south as far as the Seychelles Islands to Madagascar, east to western Australia, and perhaps even farther south and west. Whatever

the connexions of this ancient past, we do know that the continents were presumably closer together many aeons ago. Recent studies of oceanographers and geophysicists show systems of ridges deep in the oceans which parallel the continental masses and may well indicate a gradual expansion of the earth's exterior surface by the process of internal connexion or the transfer of rock materials under great heat and pressure. The continents thus may be drifting apart under the slow convection of the earth's interior at a rate of perhaps one centimetre a year. But from the point of view of the distribution of warm-blooded vertebrates these ancient connexions have little if any influence.

Between Palaeozoic times (including the Permian) and Recent time comes the vast stretch of the Mesozoic or Age of Reptiles, occupying more than one hundred thirty million years. Birds probably had their origin during the middle of this Era but it is the Cenozoic or Recent Era of the last seventy million years which has seen the evolution of birds as we know them today, warm-blooded, with feathers, untoothed bills and the other physical features of their class.

Large parts of the northern Oriental Region were under water until well on in the Recent, the Cenozoic Era. The northern fringes of the Himalayas were under the water of the great central Eurasian sea, the Sea of Tethys which continued into Pliocene times, less than twenty million years ago, gradually drying and retreating to leave behind the Mediterranean, the Black, Caspian and Aral seas. The former boundaries of the Tethys Sea extend south to West Pakistan and central India and included the drainage basin lowlands of the Indus and Ganges river systems. As the seas gradually disappeared and land rose, violent stresses in the outer layers of the earth produced foldings of the mantle to raise up mountain chains from the Alps east to the Pamirs and the Himalayas and the north-south systems of ridges of eastern Assam, Burma and southwest China.

The most recent geological period has been the Pleistocene or Ice Age, marked by four successive cold periods with cycles of glaciation, lowered climate and increased rainfall alternating with milder, drier intervening times. During these alternations, the locking up of water in the form of ice lowered the sea surface to connect many continental shelf islands such as Ceylon with the mainland. Our present climate of relative warmth and unlocking of ice with rising seas has persisted for approximately ten thousand years.

In terms of climatic history, India and the related components of the Oriental Region have been stable for a very long time. The recent ice ages of the Pleistocene may well have coincided with increased rainfall or pluvial periods in the tropics. Greater humidity and accompanying cloud cover help to create cooler average temperatures. All these conditions would suffice to lower temperatures sufficiently on mountain ranges or highlands so that temporary avenues or highways

for mountain stepping-stone-hopping can be provided for species of animals and plants adapted to cooler climates. Much of the spread then of mountain-adapted or cool climate-adapted species into the highlands of the tropical zones and their later isolation and evolution in time into a radiating network of related species can be postulated as a result of one's knowledge of the changes in the climate cycles in the Pleistocene. Thus geographical isolation could combine with small climate changes to promote adaptive changes in species. Subsequent climatic events bringing together former isolated populations a second or third time would serve as the testing ground to determine if genetic isolation had been achieved. If so, new species had been born in the process.

One of the most noted current zoogeographers of India was the late Dr Sunder Lal Hora of the Zoological Survey who developed an important thesis of the distribution of torrential river fish. His Satpura Hypothesis (1950) postulates that by middle Eocene times at the beginning of the Recent or Cenozoic Era, the Himalayan mountains began to erupt, rising up and starting the cutting off of the Tethys Sea. This rising has been slow and continuous down through the Pleistocene. South of the Himalayas in the northern Indian Peninsula volcanic action occurred in late Cretaceous and early Eocene times covering some 20,000 square miles of land with a thick series of volcanic layers known as the Deccan traps. The result was that formerly continuously distributed tropical climate species of plants, insects and vertebrates became isolated in south India and Ceylon, separated from related populations in eastern India and east to China. These upheavals, traced by geologists, affected the drainage of rivers and the distribution of related fish. Originally, peninsular Indian streams up to the Miocene Epoch had drained north into the Sea of Tethys or its related river systems. The Deccan explosives and the Himalayan rise turned peninsular Indian drainage systems to the east. Contemporary rivers of southern China and southeast Asia changed their courses from east to south and west enabling their fish species to reach Burma. Dr Hora believed that these fish from southern China eventually populated the Himalayas from the east, spreading very gradually westwards. Fossils of the Pliocene Epoch just before the Pleistocene show that fish species were becoming distributed west along the feeders of the great river called by geologists the Indobrahm, which drained the enormous marshes left by the disappearance of the Sea of Tethys.

South of the Indobrahm at the edge of the Deccan traps arose an elevated series of hills running from east to west from the southern edge of the Himalayas in Bengal and Bihar nearly to the sea at Bombay. Hora explained the distribution of the hill-stream fish along these Satpura Hills from the eastern Himalayas to western peninsular India and eventually gradually south to Kerala, and, in a few cases of related

forms of higher vertebrates and plants, aided by the climate cycles, south into Ceylon.

By Pliocene times the Ganges system of today began to form, draining the Himalayas and flowing south and east instead of west as had the Indobrahm. A recent feature of this system has been the capture of the Tsangpo, the eastward-flowing river of Tibet, through the penetration by climatic erosion of the upper Assam gorges by the Brahmaputra, a tributary of the Ganges system. Presumably the Brahmaputra did not manage to erode its way north into the Tibetan gorges to capture the Tsangpo, turning it away from the Yellow River and Yangtse systems very recently. But in a relative sense it must have been rather recently in the Pleistocene Epoch.

Even though much of this history is old, as far back as Pleistocene or late Miocene times, the resulting evolution, the resulting patterns of distribution of the avifauna of India as it is understood today, show distinct traces of these events. Sálím Ali (1949) has pointed out the importance of the Satpura Hills as an ornithogeographical highway, as has Ripley (1949).

In regard to the great marshes of late Pliocene time, aftermath of the Sea of Tethys, it would appear that several bird species in their peculiar evolution and adaptation mark the long persistence of this phenomenon. They can be thought of as living relics of a past epoch. The preference of these species is for marshes of large extent along the remains of the system, the 'Indobrahm system'. That they remain today means only that the resulting river and marsh habitats have not been too unsuitable, although one of the species has unfortunately very likely become extinct in the last thirty years. This is the Pink-headed Duck, *Rhodonessa caryophyllacea*, a relict species of the present Ganges river drainage area (Ripley, 1953).

Two other species of local distribution in marshy areas in the central and northwestern parts of the subcontinent are: 1) the Bristled Grass Warbler, *Chaetornis striatus*, and 2) the Sind Jungle Sparrow, *Passer pyrrhonotus*, the latter found as far west as eastern Iran.

Indian zoogeography shows evidence for two of the well-known zoogeographic theories. The first of these is Gloger's theory, which states that in areas of increased humidity warm-blooded animals tend to have darker surfaces than their immediate relatives living in drier areas. Many species of birds and mammals which live in the forests along the foot of the Himalayas, in the Western Ghats, or in Ceylon tend to substantiate Gloger's theory. Such small forest birds as partridges, babblers, flycatchers, warblers and sunbirds have paler populations — geographical subspecies so-called — living to the west in areas of decreased rainfall. Along the sweep of the Himalayas where the monsoon rains fall more heavily in the east, east of eastern Nepal, this phenomenon shows as a break, a discontinuity in the continuous gradual progression

4) Bluewinged Pitta, *Pitta moluccensis megarhyncha* (868), tidal forest and adjacent semi-evergreen forest in the Sunderbans of East Pakistan.

5) Grey Thickhead or Mangrove Whistler, *Pachycephala cinerea* (1470), Calcutta east through the Sunderbans, mostly in tidal forest, but also inland in semi-evergreen forest; Andaman Islands.

6) Orangebellied Flowerpecker, *Dicaeum trigonostigma* (1898), tidal forest in Sunderbans and adjacent semi-evergreen and moist deciduous forest.

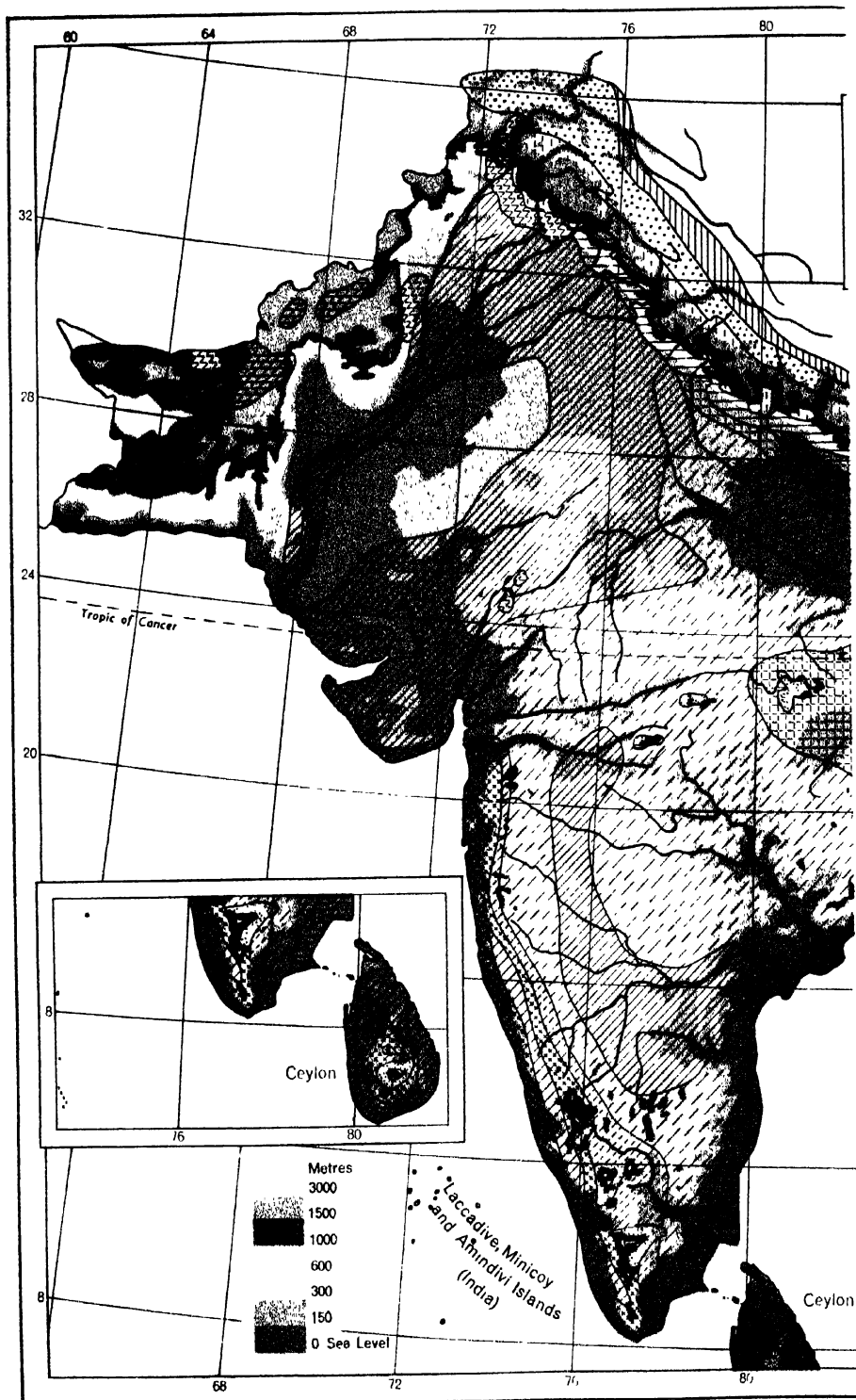
In addition certain hawks, eagles or rails may be found in tidal forest but these species have a wider tolerance for a variety of conditions.

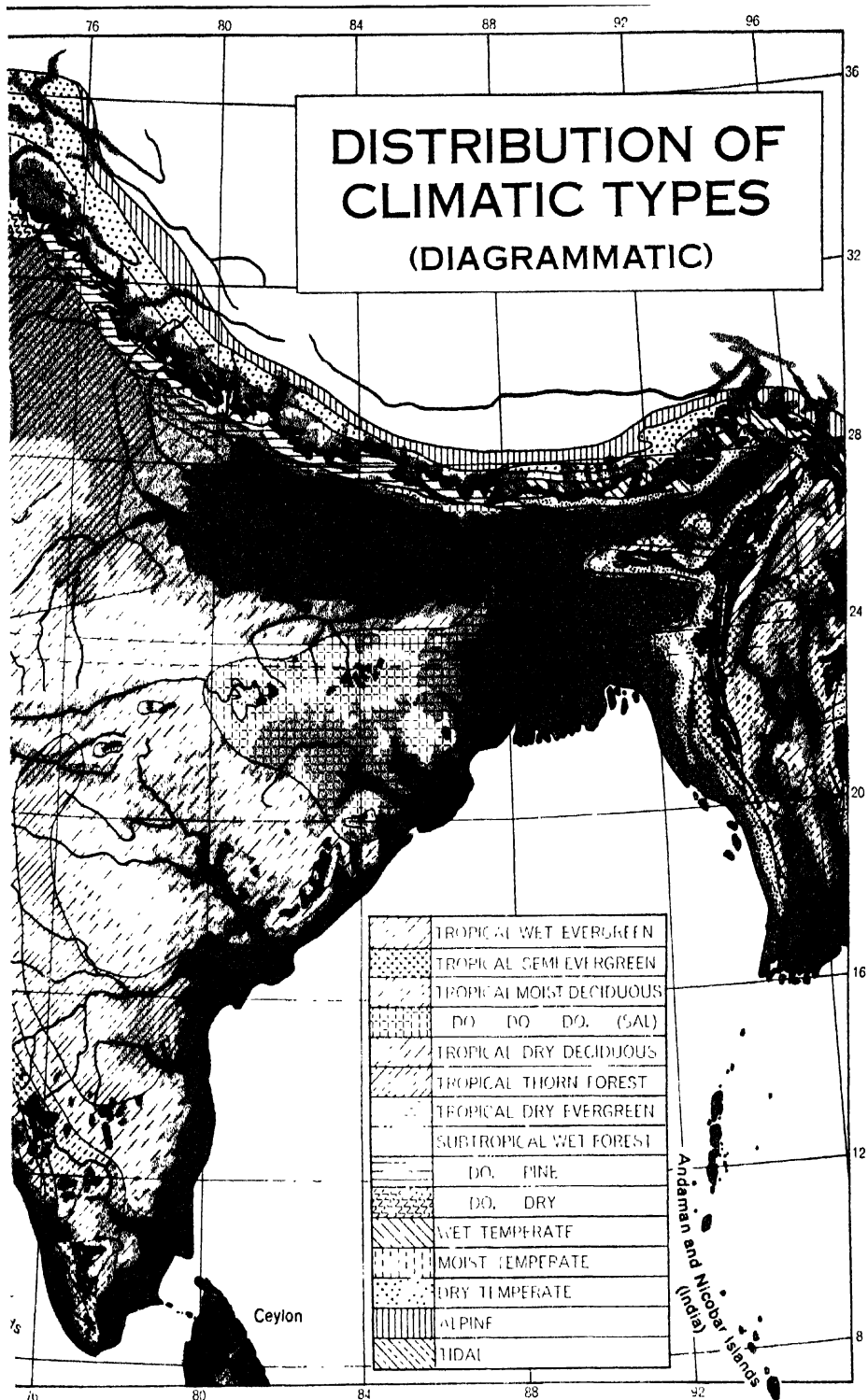
Related to the tidal forest in space and in food supply are the sea beaches themselves, where characteristic migrant shore birds, gulls and terns can be found. Some of these species prefer the open pure salt water and adjacent beach, others the tidal mudflats and brackish reaches of water, and many of these forms, particularly the terns, nest in the mangroves. The Reef Herons, *Egretta gularis schistacea* and *Egretta sacra* (50, 51), are found only on brackish or salt water, along tidal mudflats or reefs, the Crab and Great Stone Plovers, *Dromas ardeola* and *Esacus magnirostris* (434, 437, 438) are found only on sea beaches, though the latter may occur on sandy river beds of the largest rivers, an *ersatz* or substitute biotope as it were.

In contrast to the tidal forest zone, the birds of which show affinities with species of Indonesia and the China coast — the Indochinese sub-region as it has been termed by zoogeographers — consider for a moment another zone which recalls the Somali arid zone of east Africa. This is

B) Tropical Thorn Forest. This is a low open forest, characterized by *Acacia* species, reaching 6-9 m. in height, desert-like undergrowth with sparse grass, thick, woody weeds, succulents, a so-called xerophytic type of vegetation, mean temperature annually 25° C., reaching a maximum of c. 40° C., and a minimum of c. 4° C. The annual rainfall varies from 48 to 76 cm. and is sometimes as low as c. 25 cm. The soil is shallow, often alkaline. This zone occurs from sea level to c. 600 m. altitude. Thorn forest occurs in non-desert parts of West Pakistan, south of the frost line, large parts of western India, in East Punjab, Rajasthan, Kutch and Saurashtra and southwest Madhya Pradesh running south in Maharashtra to East Khandesh, Aurangabad, south to northern Mysore and east in Andhra to Guntur district; also in the Jaffna area and other parts of northern Ceylon, Rameswaram Island and the adjacent southeast Indian coast. In central peninsular India the heart of this zone occurs in the Deccan plateau, site of much of the Deccan trap rock-formations mentioned earlier.

The birds of this zone show distinct affinities with those of eastern Africa as pointed out by Meinertzhagen (1951), and emphasize that





Africa itself has been a centre of dispersal as shown by Moreau (1952) and noted in one case by Husain (1958). Typical of these are:

1) Grey Partridge, *Francolinus pondicerianus* (244-246), West Pakistan and India.

2) Likh or Lesser Florican, *Sypheotides indica* (357), tropical thorn, scrub, grassland, and cultivation in southern West Pakistan and western and central India.

3) Jerdon's Courser, *Cursorius bitorquatus* (441), perhaps extinct, Deccan tropical thorn forest.

4) The Bee-eaters have two species which suggest strongly a preference for this zone, though their more wandering habits and wider distribution make them less good examples. These are the Bluecheeked, *Merops superciliosus* (747) which breeds in West Pakistan and India and winters in Africa, and the Green, *Merops orientalis* (749-752), which occurs in tropical thorn forest from Iran to Ceylon, although one population of the species reaches Assam and Burma.

5) Two Finch-larks of the genus *Eremopterix*, namely *grisea* and *nigriceps*, the Ashycrowned and the Blackcrowned (878, 879), are Ethiopian in their affinities and live in thorn scrub and the edges of desert in tropical thorn areas.

6) Sykes's Crested Lark, *Galerida deva* (902), is found in parts of northern India and the Deccan on rather dark soils.

7) Yellowthroated Bulbul, *Pycnonotus xantholaemus* (1135), peninsular India, perhaps ranging too high in altitude to be completely in this zone.

8) Common Babbler, *Turdoides caudatus* and its relatives, Large Grey Babbler, *T. malcolmi*, and Whiteheaded Babbler, *T. affinis* (1253, 1254, 1258, 1267, 1268), West Pakistan, peninsular and northern India and Ceylon.

9) Rufousfronted Longtail Warbler, *Prinia buchanani* (1506), West Pakistan and northern and central India to the Deccan.

10) Three of the Whitethroats, the Lesser, *Sylvia curruca*, the Small, *S. minula*, and Hume's Lesser, *S. althaea* (1567, 1569, 1570), breed or winter in tropical thorn forest in West Pakistan and India.

11) Two of the Leaf Warblers, the Brown or Chiffchaff in its Indian subspecies, and the Plain, *Phylloscopus collybita sindianus* and *P. neglectus* (1576, 1577), occupy this habitat in West Pakistan and northern India.

12) Brown Rock Chat, *Cercomela fusca* (1692), West Pakistan and northern India.

13) Whitewinged Black Tit, *Parus nuchalis* (1798), India.

14) The Spanish Sparrow, *Passer hispaniolensis* (1940), winters in tropical thorn forest. Some other sparrows have ranges suggestive of a preference for the tropical thorn biotope, but have spread out into cultivation or into reed-beds and tamarisk groves.

With the exception of the warblers, virtually all of these species are related most closely to Ethiopian (= African in the zoogeographical sense) species, suggesting an origin from a former continuously distributed population or a common ancestor in some form.

As was pointed out in more detail in the *Synopsis*, there are certainly 176 endemic (local) species of Indian birds (confined to the zoogeographic subregion of the Indian Peninsula and its environs) and of these the following affinities appear:

(1) (a) related to Palaearctic species (i.e. Europe and Asia)		
	number 30	Percentage of total 17
(b) questionable, perhaps Palaearctic	2	1
(2) related to Indochinese (i.e. SE. Asian species)	109	62
(3) (a) related to Ethiopian species	30	17
(b) questionable, perhaps Ethiopian	1	1
(4) relict species, discussed earlier (Pinkheaded Duck etc.)	4	2

Thus the overwhelming proportion of Indian bird species are related to species of the eastern, tropical Orient, with almost an equal minor share being related proportionally either to African or to European-northern Asian (Palaearctic) species. This is important as a principle of Indian ornithobiography. The Himalayas have served as a barrier, encouraging the spread of tropical, Indochinese-related bird species into the Indian habitat, preventing the invasion of Eurasian-related species as much more than winter migrants. The entomological and botanical evidence, such as it is, suggests that in spite of glaciation in the Himalayas during the Pleistocene, climatically conditions were not too severe and that indeed the southern flanks of the mountains served as a refugium for relict species related to cold-climate adapted northern species, rather than serving as a continuous chain of contact along which dominant northern species could infiltrate. The habitats to the south of the Himalayas thus being continuously occupied, very few invaders could wage successful competition or find empty niches and room to spread out.

India's avifauna is one of the most interesting in the world and provides ample opportunity for further significant research in zoogeography and its related aspects of ecology.

SYSTEMATICS OF BIRDS OF THE INDIAN SUBREGION

BIRDS from the 'Indies', the areas now encompassed by Pakistan, India, Ceylon and east to Java, have been known to zoologists for as long as there has been an organized science of zoology. Travellers and explorers of both the eastern and the western worlds have collected colourful birds from the countries which they visited since the chronicles of these travels have existed. These creatures, brought back to the courts of emperors and kings, inspired wonderment as well as scientific curiosity. Attempts to list the products of nature are apparently a natural phenomenon of man's orderly and tidy mind. Man is instinctively an arranger. Subjectively man strives to create a rational order out of what otherwise he assumes to be chaos. Religion demands it. Science requires it.

The literature of these attempts at organization is classical, extending back to the philosophers, Hippocrates, Aristotle and Plato, at least to the fifth century B.C. Systematics, or taxonomy as it is often interchangeably called, is the science of classification of animals. It is built up out of the basic study of the anatomy or morphology of an animal, as well as its physiology, or the living interactions of the organ systems and structure of the animal. Modern taxonomy also includes a compilation of evidence obtained from genetics, the study of the breeding of animals including the cellular phenomena associated with the union of components from egg and sperm. An additional requirement is a knowledge of the environment and its effect upon animals, or ecology, as that study is called, as well as environmental and animal history derived from the study of geology. Thus a modern taxonomist becomes perforce an evolutionist, and an evolutionist should properly be one of the most widely trained of all zoologists, proficient in genetics, morphology, zoogeography, systematics, embryology, physiology, ecology and palaeontology.

Present-day systematics developed in the eighteenth century with the attempts to create 'systems' of nature. A number of authors such as John Ray (1627-1705) pioneered attempts to characterize the genus, or *genos*, and species, or *eidos*, of Aristotle, but it is the Swedish naturalist, Carolus Linnaeus (1707-78), who laid the foundation of systematic zoology. The tenth edition of his *Systema Naturae* (1758) is considered the fundamental work and the date, the foundation date for species names. Each animal then known to the scientific world could be given, under the Linnacan concept, a binomial name: Genus, a name including all forms considered to be related to one another, and Species, the distinctive or specific name which in a sense separated that animal from all others. All ducks belonged to the genus *Anas* for

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example, and the different ducks had different specific names, *acuta* for the pintail, *crecca* for the common teal, *penelope* for the wigeon, *ferina* for the common pochard or diving duck. Above these categories was the Order, and above this of course the Class, which in the case of birds, involved all birds in one animal class, *AVES*. The great merit of the Linnaean volume is that the class and the orders and genera are characterized by keys, groups of characters which give them uniqueness and distinction one from the other.

This arrangement then, this attempt at the creation of order from chaos, immediately won general recognition and has persisted down to the present. Subsequent modifications of the system have derived more from man's understanding of the evolutionary process and the resultant interpretation of what is meant, than from any tampering with the mechanics. In essence the philosophy of arrangement has changed with the influence on scientific thought of the Darwinian school of evolutionists. In Linnaeus's concept, each species was a distinct act of Creation, immutable and set apart. The Lord had created the world and all that lay within it in six days and on the seventh he rested. Darwin and related scientists of the mid-nineteenth century were able to show that species were not immutable, that changes occurred dating back through the panorama of geologic time and continuing on into the present and future. Species could arise out of other species, by a process involving physical isolation and the gradual accretion of small differences.

Over the years the acceptance of a dynamic rather than a static concept for species formation broadened and modified systematics. As knowledge of a wide spectrum of variations in populations of biological species increased, new terms came to be used for these differences. Linnaeus himself used the word 'variety' to describe a specimen that appeared to be atypical. Later nineteenth-century authors like Kleinschmidt began to use the word 'race'. Gradually the concept began to be refined as it became generally understood that what scientists were trying to characterize were not individuals, aberrations that is to say, individual variants, but rather groups or populations all members of which, in interaction with each other, were expressing an evolutionary trend. Thus the concept of subspecies was evolved. The definition of this category was not really refined until the twentieth century when a number of authors particularly in ornithology, such as Rensch and Mayr, reached a consensus. Two great principles are involved here. The names typifying these evolutionary categories are applied to a type specimen certainly, but they refer to an interbreeding population of common genetic inheritance. In addition a subspecies must have some geographic locus and some complex of external mechanisms which allow it to maintain genetic isolation. A subspecies must also have some essentially morphological characters

in order to allow it to be recognizable. Morphological rather than physiological or behavioural characters are still more acceptable to taxonomists than any others as they are more feasibly preserved in specimens.

All of this history of description and characterization of species has resulted in an elaborate series of rules of nomenclature over which systematic biologists have laboured for many years. The rules, after meetings and international congresses, eventually become codified into a Code for Zoological or Botanical Nomenclature. The latest official International Code of Zoological Nomenclature was published in 1961, reissued with some amendments and corrections in 1964 and will undoubtedly be reissued again and yet again. For it has become apparent over the past fifty years that man approaches his own attempts at systematizing the affairs of nature in an essentially subjective manner. Science has not yet afforded us visions of illimitable truth. Many of the essential facts of nature still elude us, and so even man's rules for order and precedence are finite. At least in the meantime we reach towards stability as we attempt to order nature.

The first bird from India to reside in the stable nomenclature of Linnaeus in 1758 was the Brown Shrike, *Lanius cristatus*, which appears on page 93 of *Systema Naturae*, the 10th edition, and is described thus: having a 'wedge-shaped tail', a 'crested head', a 'reddish body' etc. and, as with all proper names a type locality must be supplied, in this case 'Benghala' or Bengal. There is a citation to an illustration, plate 54, in George Edwards's volumes, published 1743-51, *A Natural History of Birds*. And so the type was established, a specimen figured in a published book and with a locality. The second species from 'Benghala', named by Linnaeus on page 95, is *Lanius caeruleus*, which is also illustrated in Edwards and which is now understood to be the Whitebellied Drongo, *Dicrurus caeruleus*, belonging to a different family. Linnaeus's name as author is suffixed to both *Lanius cristatus* and *Lanius caeruleus* when these names are used formally in citations in ornithological literature. But for the second bird it is placed in parentheses, as *Dicrurus caeruleus* (Linnaeus), to express the fact that the genus name has been changed or shifted subsequent to Linnaeus's original description of the species.

The third mention of Bengal in Linnaeus is *Psittacus alexandri*, whose habitat was said to be 'China, Benghala, Aethiopia', named after Alexander the Great, through whose expeditions the Redbreasted Parakeet had come to the notice of Pliny. The type of the species has subsequently been restricted to Java. Subsequently a larger subspecies has been recognized as occurring on the Asian mainland. A name for this was available, *fasciata* of P. L. S. Müller, 1776. Consequently when subspecies are arranged in linear form, the parakeet of

India becomes *Psittacula alexandri fasciata* (P. L. S. Müller)¹, and *Psittacula alexandri alexandri* (Linnaeus) is found in parts of Indonesia, the type locality being Java. And so zoology proceeded apace. Thomas Pennant's *Indian Zoology* 1791 (1790), incorporating the work of J. R. Forster and Loten's notes on new birds of south India and Ceylon, was succeeded by the really masterful work of T. C. Jerdon, whose *Birds of India*, 1862-4 in three volumes, was the first thorough work on the subcontinent.

Allan O. Hume added greatly to Jerdon's work by expanding the areas covered, particularly in the east in Assam and East Pakistan and describing many new birds for science. He also prepared the first checklist, in 1879, taken from Volume VIII of the random journal *Stray Feathers*, which he had organized and published himself. Hume's list included Pakistan, India, Ceylon and Burma east to northern Malaya, and comprised over 1700 species. He attempted to codify the rules of nomenclature as involving birds of the area by using the rules for nomenclature adopted at a meeting of the British Association in 1842. Wisdom was not infinite even then.

Hume says (p. 7): 'I say "based on the Code" because it must be clearly understood that I am not prepared to re-argue points definitely settled by that Code. I do not personally agree with many of its *dicta*, but I consider uniformity of such paramount importance as to render it the plain duty of every British naturalist to abide strictly by *all* its *dicta*.' Worthy ambition indeed; the Code is still venerated, but still manages to alter itself occasionally.

Oates and Blandford's great Handbook volumes of 1889-98 again included Burma, and again, like all preceding volumes, dealt only with the classification of birds down to the species level. It remained for E. C. Stuart Baker first to add subspecies names, or trinomials as they are sometimes called, to the Indian subregion avifauna. In this he followed Ernst Hartert, whose fundamental *Vögel der paläarktischen Fauna*, of 1910-22, reflected much of that changing philosophy of systematics which had been evolving since the close of the nineteenth century. The ideas, essentially held in America and in Germany at this time, produced the present concept of the polytypic species, a species consisting of a group of populations, closely related to each other, separated only by geographic boundaries, which could presumably interbreed should the barriers separating them break down, and which were far more closely related among themselves than in the case of any other *separate* species. At first these ideas presented considerable difficulty but by 1910 Hartert had been won over, and by 1920, Baker's Hand-list of the Birds of the Indian Empire had begun to appear in serial parts in the *Journal of the Bombay Natural History Society*. This nomen-

¹ The author's initials are used in some cases as in this, because several Müllers have written on zoology.

clature has continued to the present day, with minor variations. The greatest changes perhaps appear between the publication of Baker's handbook, *The Fauna of British India including Ceylon and Burma*, 1922-30, and the publication of *A Synopsis of the Birds of India and Pakistan together with those of Nepal, Sikkim, Bhutan and Ceylon* in 1961. As one of us (Ripley) said in the Introduction to that volume, 'It is perhaps unfortunate but true that no such listing as this or Baker's earlier work is ever final'. We can only attempt to fill in additional small gaps in the nomenclatorial picture, at the subspecific level for the most part in systematics, or in chinks or wider gaps in the understanding of the habits of birds themselves as living things.

Naturalists, environmental biologists, epidemiologists and others including amateur bird-watchers, all tend to be highly impatient of changes in the nomenclature of birds or related vertebrates as they know them. Systematists in ornithology are particularly liable to attack if changes in established or current bird scientific names are made as a result of evolutionary study. There is a good deal to be said on both sides. On the one hand the users of names want stability and a sense of ultimate finality to be maintained at all costs. On the other, evolutionists, with whom some ecologists are today beginning to be aligned, are continually seeking for the truth of the phenomena of evolution. If in the process of delineating living and organic processes, nomenclatorial stability suffers, then suffer it must. Both sides deplore pedantic name-shufflers who collect scientific names of organisms like postage stamps and are said to extract personal prestige therefrom. These days actually would seem to be gone for ever in ornithology. Only rational trained biologists tend to be concerned with systematics nowadays, and in certain areas such as botany and entomology, *alpha* taxonomy, or the mere descriptions of natural living objects, is still a responsibility of paramount importance. In birds certainly there are few surprises around the corner. New species may continue to be found at a diminishing rate in remote corners of the globe and a few new subspecies may turn up almost anywhere. But where they do, and where they are described as *new*, it is for a secondary reason, an attempt to express reality, to show that organic processes are occurring around the clock at an appreciable rate and that change is the order of the day.

Two of the most recent subspecies of birds of our subregion have been described in 1960: *Chalcophaps indica salimalii* Mukherjee, and *Ardeola grayii phillipsi* Scheer. Additional subspecies from islands of the Bay of Bengal may appear shortly.

A more depressing corollary to our changing world is that subspecies as well as species are probably disappearing today at an accelerated rate. In some areas, particularly in the tropics, and particularly in plants and in such classes of animals as the invertebrates, many of these species and subspecies may disappear before they have even been

described as new to science, leaving no ascertainable ripple in man's time to mark their passing. Only the world's pool of genetic recombination is deprived here, not man's recording of it by ascribed names. Let us hope that biologists of the future will not know many species of the great subcontinent of southern Asia only by names as we today, by accident, commemorate the lost Dodo of Mauritius or the Solitaire. For all that they have gone, they were seen by knowing men, recorded, and their bony remnants described. In India the Pink-headed Duck was described as locally tolerably common in Oates and Blanford's day; as 'most shy and secretive' by Baker thirty-one years later; and as probably extinct by ourselves thirty-six years later still. And so in two generations, within the lifetime of many people, one of the most curious species of birds in the world has vanished. 'What's in a name?' indeed. Meanwhile the science and order of systematics continues, a service, a function to those who would use it knowledgeably, an attempt to delineate forces of nature in progress both now and *in statu nascendi*.

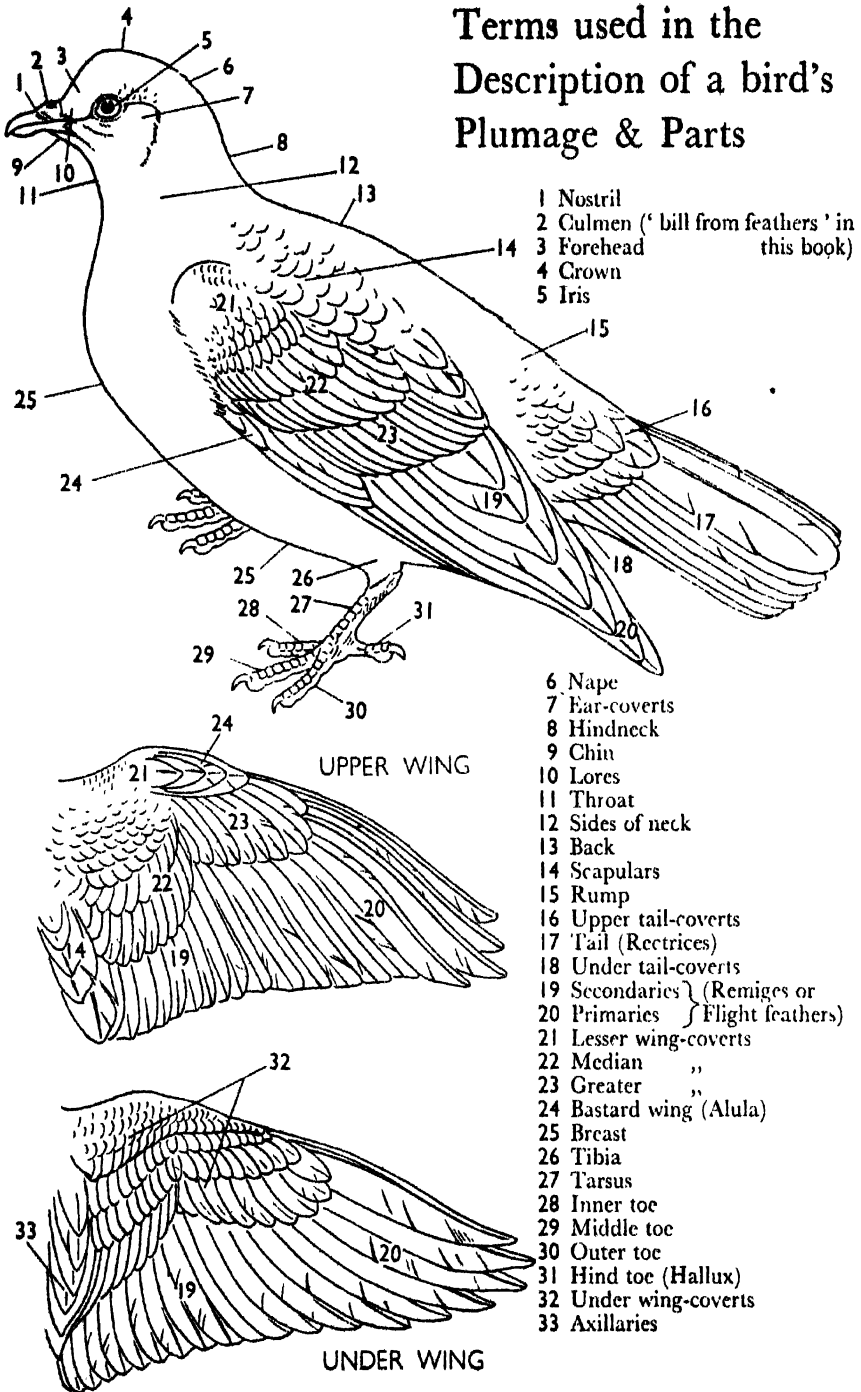
GLOSSARY OF TERMS FOR PHYSICAL UNITS

particularly as used in this book

bhābār	The zone or belt of alluvial loamy soil stretching along the northern edge of the dun or terai and up to c. 600 metres in the Himalayan foothills, from Kumaon in Uttar Pradesh to Assam (known as duar in northern Bengal and Assam). Supports a type of high dense forest usually containing sāl (<i>Shorea robusta</i>), sheesham (<i>Dalbergia sissoo</i>), and simul (<i>Salmalia malabarica</i>).
biotope	A broad physiographical unit epitomizing the interaction of diverse physical factors, chiefly temperature, rainfall, and humidity. Examples: Evergreen biotope, Desert biotope.
duār	The easternmost section of the bhabar found in northern West Bengal, Bhutan, and adjacent Upper Assam.
dūn	Hummocky broken country, often broad valleys within the outer ranges of the Himalayas, that in some sections intervenes between the bhabar and terai.
facies	A smaller but easily recognized division of a biotope, e.g. the Sandy facies, or Rocky facies, of Desert biotope.
jheel	A shallow lake in a low-lying natural depression produced by rain or floods, or spillage from a river, usually with floating and underwater vegetation and reed-beds, and partially submerged trees.
mohalla	A special quarter of a town or village where different communities or professional groups live in virtual segregation, such as harijans, silver-smiths, and bead-sellers.
nullah	Watercourse or ravine, usually dry. In Hindi, <i>nālā</i> .
shola	A patch of montane evergreen wet temperate forest, usually in a sheltered nullah or hill stream valley amongst rolling grassy hills (or downs), from c. 1500 metres up, in South India and Ceylon.
terāi	The undulating alluvial, often marshy, strip of country stretching along the southern edge of the bhabar and dun south to the Gangetic Plain. The terai extends through U.P., Nepal, and northern W. Bengal to Assam. It supports 'seas' of tall elephant grass interspersed with tracts of dense forest. Large parts of it have now been cleared and drained for cultivation. ¹

¹ The descending order in which the different zones occur is: Himalayan foothills bhabar (or duars) → dun → terai → Gangetic Plain.

Terms used in the Description of a bird's Plumage & Parts



ABBREVIATIONS

Bull. BOC	<i>Bulletin of the British Ornithologists' Club</i>
FBI	<i>Fauna of British India, Birds</i>
J. Orn.	<i>Journal für Ornithologie, Berlin</i>
JBNHS	<i>Journal of the Bombay Natural History Society</i>
PZS	<i>Proceedings of the Zoological Society, London</i>
SF	<i>Stray Feathers</i>
SZ	<i>Spolia Zeylanica</i>

Abbreviated references to persons frequently quoted

Abdulali or HA	Humayun Abdulali
Alexander	W. B. Alexander
Amadon	Dean Amadon
Baker	E. C. Stuart Baker
Biswas or BB	Biswamoy Biswas
Delacour	Jean Delacour
Donald	C. H. Donald
Gibson-Hill	C. A. Gibson-Hill
Hartert	Ernst Hartert
Hume	A. O. Hume
Inglis	C. M. Inglis
Jerdon	T. C. Jerdon
Jones	A. E. Jones
Legge	Col. W. Vincent Legge
Ludlow	Frank Ludlow
Magrath	Major H. A. F. Magrath
Marshall	Cols. C. H. T. & G. F. L. Marshall
Mayr	Ernst Mayr
Meinertzhagen	Col. R. Meinertzhagen
Murphy	R. C. Murphy
Osmaston or BBO	B. B. Osmaston
Peters	J. L. Peters
Phillips	W. W. A. Phillips
Ripley or SDR	S. Dillon Ripley
Sálim Ali or SA	Sálim Ali
Scully	John Scully
Stevens	Herbert Stevens
Stresemann	Erwin Stresemann
Ticehurst or CBT	Claud B. Ticehurst
Whistler or HW	Hugh Whistler
Whitehead	Lt C. H. T. Whitehead

Order GAVIIFORMES

Family GAVIIDAE: Divers, Loons

Aquatic birds superficially like grebes but differing in a number of characters and probably not very closely related to them. Toes fully webbed like duck's, not lobed or scalloped. Wing of 11 primaries, the outermost minute. Rectrices 18 or 20, short but well developed. Plumage dense, compact and rather harsh, not silky as in grebes. Tarsi reticulate, laterally compressed. Legs short and set far back, almost at end. Wings short, narrow, and tapering; set well back as in a Boeing jet plane. Sexes alike.

For other anatomical characters see Stresemann 1927-34, *Aves*: 779-80; Witherby *et al.* 1940, 4: 111; Palmer 1962, 1: 20.

Genus GAVIA J. R. Forster

Gavia J. R. Forster, 1788, *Enchirid. Hist. Nat.*: 38. Type, by subsequent designation, *Colymbus Immer* Brännich

Characters as of the Family. Genus northern Holarctic.

Key to the Species

	Page
A Bill straight	1
B Bill upturned	2
1 Upperparts uniformly dark	1
Upperparts 'scaly'	1
2 Upperparts sprinkled with white spots	2

1. **Blackthroated Diver.** *Gavia arctica suschkini* (Zarudny)

Urinator arcticus suschkini Zarudny, 1912, *Orn. Mitt.* 3: 11 (Russian Turkestan)

Baker, FBI No. 2293, Vol. 6: 485

LOCAL NAMES. None recorded.

SIZE. Domestic duck \pm ; length c. 65 cm. (25 in.).

FIELD CHARACTERS. A practically tailless aquatic bird, in winter dark grey above white below without black throat. Pointed straight bill. Overall aspect that of Little Grebe or Dabchick, but much larger and heavier. Neck stouter and proportionately shorter than grebe's. Confusable only with the commoner Crested Grebe, but larger size, stouter neck, and absence of ruff of elongated feathers below head diagnostic. Sexes alike.

STATUS, DISTRIBUTION and HABITAT. A rare vagrant in winter. Only once recorded: a single specimen on flooded land bordering the W. Jumna Canal at Jagadhri, Ambala District, Punjab — 19 February 1922 (A. E. Jones 1922, JBNHS 28: 1134).

Extralimital. Breeding from the Ural Mts to Lake Baikal and the Yenisey, Turkestan, and Kirghiz Steppes.

MIGRATION. ?

GENERAL HABITS. Swims low, often only with the head showing. Rises from water with effort, running long distances on surface with quick-flapping short wings, but is a swift and powerful flier once air-borne. Hunchbacked merganser-like profile in flight with legs projecting behind distinctive. Hits water with chest when landing; cannot take off from dry land. Expert deep-water diver and submarine swimmer, using feet as propellers and wings to turn and twist. Keeps to inland lakes.

FOOD. Mainly fish.

VOICE and CALLS. ?

BREEDING. Extralimital.

MUSEUM DIAGNOSIS. For plumage etc. see Witherby *et al.* 1940, 4: 119. This race, *suschkini*, differs only in details from the nominate race there described.

The Ambala specimen, a first-year female, had a wing measuring 290 mm. Hartert (1920: 1461) gives the wing measurements of this race as 291-337 mm.

[2. The **Redthroated Diver**, *Gavia stellata* (Pontoppidan), has been recorded once from the Makran Coast (Baker 1931, 8: 703). It conceivably may occur again as a vagrant in West Pakistan.]

Order PODICIPEDIFORMES

Family PODICIPITIDAE: Grebes

Aquatic birds with soft rudimentary tail, very small wings, and compressed sharply pointed bill. Legs placed far back, especially adapted for swimming and diving. Tarsi scutellated in front, laterally compressed. Front toes with broad lateral vane like lobes. Hind toe small, raised, vertically lobed. Nails broad and flattened. Plumage dense and silky. Primaries 12, the 1st from the outside (= ascendant) being rudimentary. Sexes alike. Downy young boldly striped blackish and white.

For further anatomical details see Witherby *et al.* 1940, 4: 84; Stresemann 1927-34 Aves: 780-82; Palmer 1962, 1: 62.

Genus *PODICEPS* Latham

Podiceps Latham, 1787, Gen. Syn. Bds., Suppl., 1: 294. Type, by subsequent designation, *Colymbus cristatus* Linnaeus

Characters as of the Family. Genus cosmopolitan; represented within our limits by three species.

Key to the Species

	Page
A Size of duck (c. 50-60 cm. = 19.5-23.5 in.)	1
B Smaller than duck (c. 23-35 cm. = 9-13 in.)	2
1 Long slender neck with straight bill, head ornamented with backward pointing tufts above and a frill or ruff of black chestnut feathers below	3
Head ornamentation reduced or lacking, white above eye conspicuous, bill pinkish	3

- 2 Needle-like bill with slightly upturned appearance.....a
 Bill rather thick and straight.....b
 a Head and neck black, tufts of golden brown feathers on sides of head.....*P. nigricollis* (breeding) 5
 Head and neck dark greyish black; white of throat extending around nape.....*P. nigricollis* (winter) 5
 b Cheeks and lower throat chestnut, cap and back of neck greyish black, upper throat black.....*P. ruficollis* (breeding) 6
 Sides of head and foreneck pale rufous, cap darker, upper throat white.....*P. ruficollis* (winter) 6

3. **Great Crested Grebe.** *Podiceps cristatus cristatus* (Linnaeus)

Colymbus cristatus Linnaeus, 1758, Syst. Nat., ed. 10, 1: 35 (Sweden)

Baker, FBI No. 2290, Vol. 6: 477

Plate 1, fig. 9, facing p. 16

LOCAL NAME. *Shiva-hñns* (Assam).

SIZE. Domestic duck —; length *c.* 50 cm. (*c.* 19 in.).

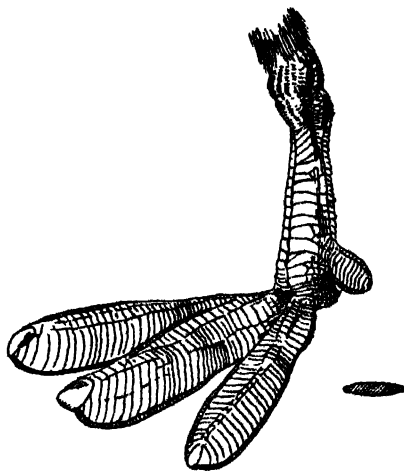
FIELD CHARACTERS. A tailless aquatic bird dark greyish brown above, silky white below, with slender longish neck and pointed bill. Two up-standing, backwardly directed blackish ear-tufts above head and a frill or ruff (looking like puffed-out throat) of chestnut-and-black elongated feathers below the head, conspicuous and diagnostic; less developed in female than male. In winter (non-breeding plumage) these 'ears' much reduced; in young birds absent. A white wing patch (secondaries) and white leading edge of wing concealed at rest, conspicuous in flight, when humpbacked profile is reminiscent of Merganser. Sexes alike. Singly, pairs, and small scattered parties on jheels and littoral waters.

STATUS, DISTRIBUTION and HABITAT. Winter visitor in small numbers to northern India from Sind (where it is commoner at sea along the coast) to NE. Assam and Manipur; south to Gujarat on the west (Kutch, Porbandar, Jasdan, Viramgam, Bhavnagar), and Orissa on the east (near Puri — sight record, H. G. Alexander). Affects jheels and littoral waters.

Extralimital. The Palaearctic Region — Europe to China and Japan, south to our limits in Ladakh, Kashmir, and possibly Nepal.

MIGRATION. No specific information.

GENERAL HABITS. Usually seen in separated pairs or scattered parties on vegetation-covered reed-bordered jheels swimming about with neck



× *c.* $\frac{1}{2}$

With cross-section of tarsus

erect. When alarmed, disappears smoothly or with a little leap and swims away under water; surfaces then dives again, and so on till it gains the safety of distance and open water. Is loth to fly, rising with effort, pattering along the surface for long stretches, half running half flying till airborne. But is capable of covering long distances on migration or when shifting from one jheel to another. Flight swift though seemingly laboured, with rapid flaps of the short wings. Seldom seen on land, where the backwardly placed legs enable it merely to shuffle along clumsily with breast on ground. Courtship display, first described by J. S. Huxley (1914, PZS: 491-562), consists of the pair facing each other with rigid neck, ear-tufts erect and ruff expanded, both birds diving and coming up with water weeds in their bills, suddenly rising upright breast to breast and swaying — and variations of this theme.

FOOD. Fish, tadpoles, frogs, water insects, etc., with some vegetable matter. Stomachs of three specimens collected by Meinertzhagen in Ladakh contained exclusively freshwater shrimps (*Gammarus*). A quantity of feathers has frequently been reported among the stomach contents.

VOICE and CALLS. Described as a harsh *krek-krek* and a variety of discordant barks and shrill trumpeting expressive of different emotions.

BREEDING. Within our limits recorded from Khushdil Khan lake in Baluchistan (alt. *c.* 1750 m.) and from the high-elevation lake Tso Kar in Rupshu, Ladakh (alt. *c.* 5200 m.). In W. Tibet SA found it nesting on Ding Tso lake (alt. *c.* 5300 m.) NE. of Manasarovar. *Season*, chiefly June to August. *Nest*, a conspicuous mass of water weeds *c.* 45 to 60 cm. in diameter with a depression in the middle, on floating mounds of grass and rubbish 20 to 100 metres from the bank, loosely anchored to growing weeds. Often clusters of several nests together, from a few metres apart to almost touching one another. *Eggs*, 3 to 5, very pale sea-green with an overlay of chalky white calcium deposit, usually becoming stained brown by contact with the soggy nest. Fourteen eggs taken by Ludlow on the Kala Tso in Tibet average 54.50×25.00 mm. Compared with the average size of 100 British-taken eggs as given by Witherby (54.8×36.7 mm.) they are considerably narrower. Both parents incubate. Ludlow observed that the male frequently sat on the nest alongside of the brooding female. The incubation period is recorded as 28 days. When leaving the nest to feed, or on alarm, the sitting bird usually covers up the eggs with loose nest material.

From the fact that a few pairs may usually be seen on the great swamps north of the Brahmaputra river in Assam during the breeding season every year, Baker (1932-5, 4: 518) surmises that they breed there sporadically and maybe even regularly. Bulkley (JBNHS 6: 501) found a nest near Kharaghoda, Gujarat, in August 1891, and there is some indirect evidence that odd pairs may also breed irregularly in Gujarat and Saurashtra.

MUSEUM DIAGNOSIS. For description of plumages etc. see Witherby 1940, 4: 91.

MEASUREMENTS. Three specimens collected by Meinertzhagen in Ladakh measure:

	Wing	Bill (from feathers)
2 ♂♂	202, 203	43, 45 mm.
1 ♀	192	41 mm.

Baker, loc. cit., gives range for ♂ ♀ W. 176–211; Culm. 45–53; Tar. 52–64 mm.

COLOURS OF BARE PARTS. 'Iris carmine-red, crimson with a narrow inner ring of orange, or orange with an inner ring of pale yellow; bill dark brown, the tip paler and slaty grey, the extreme base suffused with crimson, obsolete in winter; legs and feet olive-green externally, yellowish-green inside; webs yellowish, the nails bluish.'

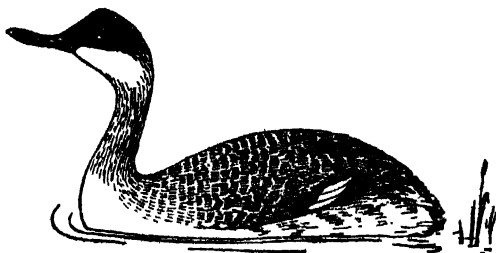
4. Blacknecked Grebe. *Podiceps nigricollis nigricollis* Brehm

Podiceps nigricollis Brehm, 1831, Handb. Naturg. Vog. Deutschl.: 963 (E. Germany)
Baker, FBI No. 2291, Vol. 6: 480

LOCAL NAMES. Unrecorded.

SIZE. Dabchick+; length c. 33 cm. (13 in.).

FIELD CHARACTERS. Distinguished from the familiar Dabchick or Little Grebe in winter by larger size and the silvery white flanks, flashing in good light. Sexes alike.



Winter plumage, $\times c. \frac{1}{4}$

Adult (winter). *Above*, dark brown with darker (blackish) cap to below eyes. *Below*, chin and throat mixed black and white, foreneck dark brown, rest of underparts white. No dusky brown on flanks. Bill slender, pointed, slightly uptilted in profile. In summer plumage has black head and neck and lengthened rufous-golden feather tuft from below eye.

STATUS, DISTRIBUTION and HABITAT. Uncommon winter visitor, sporadically recorded in Baluchistan (nr. Quetta), Sind (Karachi, Makran Coast littoral, Manchar Lake), Punjab (Bahawalpur), Uttar Pradesh (Pyagpur), Maharashtra (near Poona). Possibly occurs more generally in northern India than is identified. Recently (winter 1964–5) reported on Khabakki lake, W. Pakistan Salt Range, in gatherings of 300 to 600 individuals, vastly outnumbering *Podiceps ruficollis* (C. D. W. Savage, in *epist.*). On duck-shooting jheels.

Extralimital. Breeds in the Palaearctic Region from Europe to China and Japan, south to Turkestan.

MIGRATION. ?

GENERAL HABITS. Frequents reed-bordered jheels with floating vegetation interspersed with expanses of open water, in company with dabchicks. Prefers reedbeds in the shallows to open water, and is inclined to segregation. Otherwise very similar to the dabchick.

FOOD. Fish, tadpoles, shrimps, aquatic insects, etc., with which a quantity of feathers (its own?) is usually taken.

VOICE and CALLS. Unrecorded in India.

BREEDING. Within our limits recorded only from Baluchistan (Khushdil Khan lake near Quetta) where Meinertzhagen found over 70 nests with eggs on 20 June 1913. *Season*, June-July. *Nest*, a floating pad of weed stalks, c. 37-43 cm. across, firmly attached to the bottom as shown by all the above nests drowning on rise of water level in flood. Sited in reedbeds, not open water as with Crested Grebe. *Eggs*, 3-5, like the latter's but smaller. Average size c. 44×32 mm. Both parents brood. Incubation period recorded as 19-20 days. Small striped downy young often carried on swimming parent's back, cradled between slightly raised wings, sometimes even when parent dives. Newly hatched young often nestled in fluffy plumage of back of incubating parent to keep away from soggy nest, and fed by other parent in this position (W. Wüst, *J. Orn.*, 1934: 311-18).

MUSEUM DIAGNOSIS. For description of plumages etc. see Witherby 1940, 4: 105-6.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus
♂ ♀	123-137	39-43	c. 20-26, generally 21-24 mm. (Baker)

Wing of a ♂ from Poona in BNHS Coll. 142 mm.

COLOURS OF BARE PARTS. Iris reddish brown to orange-pink with silvery inner ring round pupil. Bare loreal skin, brownish flesh. Bill bluish plumbeous, black on ridge of culmen, whitish at tip. Legs and feet blackish and greenish to bluish.

MISCELLANEOUS. Longevity (from ringing data) 6+ years (Ring, 1962, 33: 148).

5. Little Grebe or Dabchick. *Podiceps ruficollis capensis* Salvadori

Podiceps capensis Salvadori, 1884, Ann. Mus. Civ. Genova (2), I: 252 (Shoa, Africa)

Baker, FBI No. 2292, Vol. 6: 481

Plate 1, fig. 10, facing p. 16

LOCAL NAMES. *Pāndubi*, *Pāntiri*, *Dūbdūbi*, *Churaka* (Hindi); *Dūbdūbi*, *Pāndūbi*, *Dūbūri* (Bengal); *Munu-gudi-kodi* (Telugu); *Mūkkūlīppān* (Tamil); *Tūbino* (Sind); *Pind* (Kashmir).

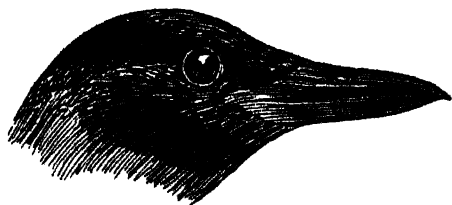
SIZE. Tailless pigeon \pm ; length c. 23 cm. (9 in.).

FIELD CHARACTERS. A small squat tailless aquatic bird with short pointed bill and backwardly placed legs specially adapted for swimming and diving. Rides on the water with rear end raised and fluffed out producing a bluntly rounded effect.

Adult. *Above*, dark brown, the crown darker; sides of head, throat and neck chestnut. *Below*, silky smoky white with the *flanks dusky brown* (contra *P. n. nigricollis*). A white patch on wing (secondaries) conspicuous only in flight. Base of bill and swollen fleshy gape yellowish green, prominent. In non-breeding plumage, mostly in winter, a drab brown bird with whitish chin, pale rufous neck and whitish underparts. Sexes alike.

STATUS, DISTRIBUTION and HABITAT. Chiefly resident, but shifting locally and long distances dependent on drought and flood. Part of populations

possibly also migratory. Common throughout the Indian subcontinent, east to Assam and Manipur, south into Ceylon, from the plains to *c.* 1800 m. altitude (in Kashmir). Absent in the Andaman and Nicobar islands. Frequents all types of inland waters with or without floating vegetation or reeds — irrigation reservoirs, village tanks, ponds, moats of ancient forts, etc., even flooded roadside ditches and borrow-pits. Hardly ever rivers or the sea.



× *c.* 1

Extralimital. Our race *capensis* occurs in much of N. Africa, Madagascar, Middle East, and SE. Asia.

MIGRATION. Unknown, but an exhausted specimen picked up on Jakko Hill, Simla (*c.* 1500 m.) — quite out of its normal range — on 17 September 1942 (A. E. Jones, JBNHS 43: 661) seems clearly suggestive of migratory movement.

GENERAL HABITS. Usually keeps in separated pairs or small scattered parties. Enormous gatherings of hundreds strong may commonly be met with on the bigger jheels such as the Manchar lake in Sind, and the Logtak in Manipur (Assam). Also on the 'Salt Lakes' near Calcutta. An excellent diver and underwater swimmer. Disappears smoothly below the surface without leaving a ripple, or takes a little upward leap to plunge vertically with astonishing suddenness. After being fired at once, will often vanish before the charge of shot can reach it a second time! The birds are fond of disporting themselves at sunset, chasing one another, pattering on the surface half running half flying with rapid flapping (vibrating) of the diminutive wings, to the accompaniment of shrill tittering or trilling duets and choruses. They are loth to fly, and when alarmed will either dive for safety or patter along and fly a short distance close to the surface presently to flop down again. Once properly airborne, however, they can fly incredibly well and strongly, and often travel long distances.

FOOD. Fish, frogs, tadpoles, crustacea, molluscs, aquatic insects, etc. As in other grebes some feathers also swallowed. Food mostly procured by diving, but also on surface from under floating vegetation by swift spurts forward, neck outstretched, to seize escaping quarry.

VOICE and CALLS. In addition to the runs of shrill, rather musical trilling, a sharp monosyllabic *click* is uttered repeatedly when agitated, as on approach of nest by intruder; and also sharp squeaks like an uncoiled bicycle wheel.

BREEDING. Season varies in different parts of the country depending on rainfall and availability of suitable breeding waters; chiefly April to October in northern and peninsular India, December to February in the

south and in Ceylon. *Nest*, a rough pad of sodden weeds and rushes, *c.* 30 cm. across the top of the shallow central depression. Floating or bedded on water weeds, and usually anchored to the reeds or substrate; often in clusters or colonies partly submerged and liable to drown by flood. It has been noted (Williams, JBNHS 33: 619) that the temperature of the water round the eggs within a half-submerged nest is higher than that of the lake, perhaps as a result of the fermentation of the soggy nest material. This may prevent chilling of the eggs and account for the birds being able to leave them unattended for long periods. Copulation usually takes place on the nest when the female is sitting on it. *Eggs*, 4 or 5, sometimes 3 or 6, rather pointed at both ends, chalky white becoming stained dirty brownish during incubation by contact with the sodden nest. Average size *c.* 36 × 25 mm. The birds cover up the eggs with loose nest material every time they leave the nest. Both sexes incubate, and tend the young. Incubation period recorded as 19–20 days. Two (or more?) broods are raised in succession. When the female is incubating the second clutch, the care of the first brood of downy young devolves entirely on the male.

The downy striped and spotted hatchlings can swim almost as soon as hatched, but dive when a day (?) old clumsily with a splash, remaining submerged only for a short time. When first venturing forth from the nest they hold on with the bill to the parent's flank feathers at the rear and are thus towed along. On scenting danger the parent gives the tittering alarm note, at the same time partly raising its wings and dipping its posterior. The chicks clamber up the incline and ensconce themselves between the scapulars and are carried away to safety.

MUSEUM DIAGNOSIS. For details of plumages of the nominate race *ruficollis* see Witherby 1940, 4: 109–11. Our race *capensis* differs from it in having white bases to the primaries and more white on the secondaries.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	94–109	18–22	30–35 (Baker)	<i>c.</i> 23–33 mm. (SA)

COLOURS OF BARE PARTS. Iris reddish brown or deep red, or orange yellow, with a circle of fine brown spots round pupil. Bill in adult black, the extreme tip pale and the base and gape (swollen) yellow or greenish yellow; in downy young cherry red. Legs and feet greenish black or black.

Order PROCELLARIIFORMES

Key to the Petrels, Shearwaters and Storm Petrels (Procellariidae and Hydrobatidae) recorded in Indian waters

	Page
A Large-sized (<i>c.</i> 50 cm. = 19½ in.), dark above and below, bill pale fleshy white..... <i>Procellaria carneipes</i>	11
B Large-sized (<i>c.</i> 40–48 cm. = 15½–19 in.), dark above and white below	1
C Medium-sized (<i>c.</i> 36 cm. = 14 in.), with dark head, chequered upperparts, and white underparts..... <i>Daption capensis</i>	10

D	Medium-sized (c. 33-36 cm. = 13-14 in.), dark above and below	2
E	Small-sized (c. 17.5-28 cm. = 7-11 in.), dark above and below	3
F	Small-sized (c. 19-31 cm. = 7½-12 in.), generally dark above with some white in plumage	4
1	White face streaked with black, upperparts scale-like in appearance, (c. 40-48 cm. = 15½-19 in.)..... <i>Procellaria leucomelaena</i>	11
	Uniformly dark above, white below (light phase) or all dark (dark phase), tail cuneate (c. 42-48 cm. = 16½-19 in.)..... <i>Procellaria pacifica chlororhyncha</i>	12
2	Bill dark brown, body feathers paler below than above, tail short and rounded (c. 33 cm. = 13 in.)..... <i>Procellaria tenuirostris</i>	13
	Bill very stout and black (c. 36 cm. = 14 in.)..... <i>Bulweria aterrima</i>	15
3	Bill short (c. 29 mm.), tail long, wedge-shaped, feet flesh-coloured	
 <i>Bulweria fallax</i>	15
	Dark all over, wedge-shaped tail, pale legs (c. 25-28 cm. = 10-11 in.)	
 <i>Bulweria bulwerii</i>	16
	Dark all over, smaller, forked tail (c. 17.5-19 cm. = 7-7½ in.).....	
 <i>Oceanodroma leucorhoa monorhis</i>	21
4	Sooty black above with white underparts, dark colour of back extending to sides of breast (c. 29-31 cm. = 11½-12½ in.).....	
 <i>Procellaria herminieri bailloni</i>	13
	Sooty black above with white rump, underparts white with black band running longitudinally along middle of belly through under tail-coverts (c. 20.5 cm. = 8 in.)..... <i>Fregetta tropica melanogaster</i>	20
	Dark all over with white rump, pale wing-bar, square tail, and yellow webs of toes (c. 19 cm. = 7½ in.)..... <i>Oceanites oceanicus oceanicus</i>	17

Family PROCELLARIIDAE: Petrels, Shearwaters

Sea birds of very diverse sizes and coloration, almost from goose to myna, and white, grey, brown, or black plumage or combinations of these. Bill short and stout to longish and slender, covered with horny plates, hooked at tip. Nostrils tubular. Wings narrow, long, and pointed with first primary longest, and secondaries short. Tarsus short to medium, slender, laterally compressed, reticulated. Feet webbed, with strong hindclaw. Tail short, rounded. Sexes alike.

Genus DAPTION Stephens

Daption Stephens, 1826, in Shaw's Gen. Zool. 13(1): 239. Type, by original designation, *Procellaria capensis* Linnaeus

Bill short, stout, gonys angulate near the end, and the extremity inclined upward. Nostrils divided within the tube but terminating in a single orifice. Wings long: 1st quill (as.) longest; secondaries short. Tail of 14 feathers rather short, slightly rounded at end. Tarsus slender, reticulate, somewhat compressed and shorter than the middle or outer toe; hindclaw stout.

Contains only a single species.

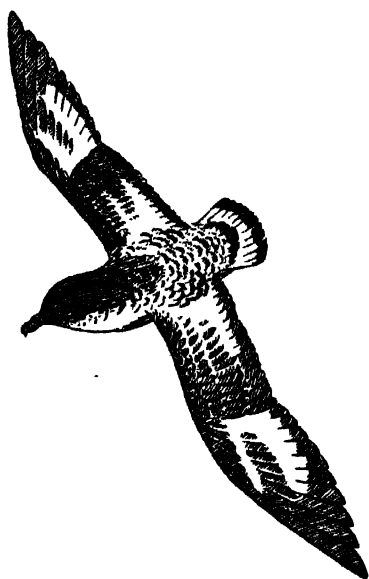
6. **Cape Petrel.** *Daption capensis* (Linnaeus)

Procellaria capensis Linnaeus, 1758, Syst. Nat., ed. 10, 1: 32 (Cape of Good Hope)
Baker, FBI No. 2201, Vol. 6: 307

OTHER NAME. Cape Pigeon.

SIZE. Pigeon; length *c.* 36 cm. (*c.* 14 in.).

FIELD CHARACTERS. A black and white pelagic petrel with a dark head, conspicuously chequered back, and two large roundish white patches on upper surface of each wing.



× *c.* 1/10

Adult. *Above*, head, neck, and upper back sooty brown. A small white streak below eye. Rest of back white with black spots producing a chequered effect. Tail white with broad black terminal band. *Below*, white, including under surface of wings. Sexes alike.

STATUS, DISTRIBUTION and HABITAT. Breeds in the Antarctic zone; ranges widely over the southern circumpolar oceans. Said to be one of the commonest petrels in the southern hemisphere, often following ships to pick up garbage thrown overboard.

The sole record for our area is a specimen obtained in the Gulf of Manaar, between Ceylon and the Indian mainland (Hume, *Ibis* 1870: 438 and *Stray Feathers* 7: 463), now in the British Museum.

MUSEUM DIAGNOSIS. For description of plumages, measurements, moults and biology, see Murphy 1936: 601-10.

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂ ♀	240-268	29-32	42-46	92-108 mm.

COLOURS OF BARE PARTS. Iris brown. Bill black, the skin between the rami red. Legs and feet black.

Genus PROCELLARIA Linnaeus

Procellaria Linnaeus, 1758, Syst. Nat., ed. 10, 1: 131. Type, by subsequent designation, *Procellaria aequinoctialis* Linnaeus (Gray, 1840, cf. *Ibis*, 1949: 512)

Cf. Phillips, W.W.A. 1951, *Spolia Zeylanica* 26(2): 151-3.

Bill long, slender, compressed, much hooked at the point and with both mandibles turning down at tip. Nostrils tubular ending in two distinct oblique orifices ('double-barrelled') directed forward and upward, with a broad division between them. Wings long and pointed: 1st primary (as.) longest. Tail of 12 feathers, rather long and graduated. Tarsus reticulated, compressed and sharp in front; shorter than the middle and outer toes which are subequal. A small hindclaw.

Oceanic birds of moderate size.

7. **Whitefronted or Streaked Shearwater.** *Procellaria leucomelaena*
Temminck

Procellaria leucomelas Temminck, 1835, Planch. Col. d'Ois. livr. 99: 597

(Seas of Japan and Nagasaki Bay)

Baker, FBI No. 2199, Vol. 6: 306

SIZE. Brownheaded Gull \pm ; length *c.* 48 cm. (*c.* 19 in.).

FIELD CHARACTERS. Pelagic. Recognized by its white face streaked with black.

Adult. *Above*, dark brown with black wings and tail. *Below*, white, including under surface of wings. Sexes alike.

STATUS, DISTRIBUTION and HABITAT. North Pacific Ocean from Korea and Japan south in winter to Philippine Is., Borneo, Moluccas and New Guinea. Breeds in colonies on small offshore islands, e.g. in Japan, in burrows excavated in earthen hillsides.

Only one record for our area — a specimen taken at Mt Lavinia, Ceylon, in 1884. (Skin in British Mus.)

MUSEUM DIAGNOSIS. For details of plumage, breeding etc. see Hachisuka 1932: 252; breeding biology Austin and Kuroda 1953: 304.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	305–339	48–53	46–54	131–150 mm. (Baker)

COLOURS OF BARE PARTS. Iris dark brown. Bill dark horn-colour. Legs and feet flesh-colour, the outer toe darker (Baker).

8. **Pinkfooted Shearwater.** *Procellaria carneipes* (Gould)

Puffinus carneipes Gould, 1844, Ann. & Mag. Nat. Hist. 13: 365

(small islands off Cape Leeuwin, West Australia)

Baker, FBI No. 2198, Vol. 6: 305

SIZE. Brownheaded Gull \pm ; length *c.* 50 cm. (*c.* 20 in.).

FIELD CHARACTERS. Pelagic.

Adult. *Above* and *below* dark sooty brown or chocolate-black; sides of head and neck paler greyish brown. Pale fleshy bill and feet. Sexes alike.

STATUS, DISTRIBUTION and HABITAT. 'Indian and Pacific oceans from the Australian seas north in the (southern) winter to Ceylon, Japan, California....' (Alexander 1955: 23–4). Breeds on islands off southwestern Australia and northern New Zealand, and at Lord Howe Island. Within our area two specimens taken in Ceylon, one in 1879 (Wait 1931: 413), the other in 1945 (Osman Hill 1945, JBNHS 45: 239–40). More recently small numbers observed in the Maldive Islands in July (Phillips 1958, JBNHS 55: 216).

MUSEUM DIAGNOSIS. For description of plumages, biology, etc. see Murphy 1936: 658.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	299-316	41-46	c. 52-56	137-148 mm.

COLOURS OF BARE PARTS. Iris brown. Bill, feet and legs flesh colour, the tip of both mandibles dusky and darker (Baker).

9. **Wedgetailed Shearwater.** *Procellaria pacifica chlororhyncha* (Lesson)

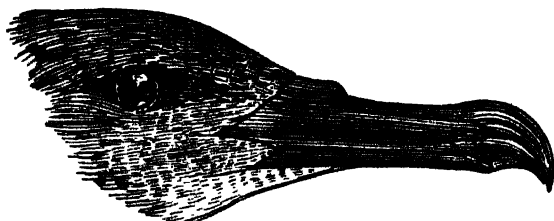
Puffinus chlororhynchus Lesson, 1831, *Traité d'Orn.*, Livr. 8: 613

(Sharks Bay, Western Australia)

Baker, FBI No. 2196, Vol. 6: 303 (= *Puffinus pacificus hamiltoni* Mathews)

SIZE. Brownheaded Gull \pm ; length c. 48 cm. (c. 19 in.).

FIELD CHARACTERS. Pelagic. *Above*, dark chocolate-brown, primaries and wedge-shaped tail black. Face and throat dark brownish grey. *Below*, dimorphic, greyish brown (dark phase), or white (light phase). Sexes alike.



\times c. 1

STATUS, DISTRIBUTION and HABITAT. Warmer parts of the Indian and Pacific oceans. Breeding at Seychelles, Mauritius, Fouquet, and Rodriguez; ranging widely over the western Indian Ocean. From within our area 4 specimens, all taken on the W. coast of Ceylon, are in the Colombo Museum. An old sight record at Trincomalee by Col. Legge (Wait 1931: 412) and another by W. W. A. Phillips at Colombo in 1949 (1950, JBNHS 49: 289). According to the latter this shearwater is probably a regular summer visitor to coastal Ceylon. He found it (presumably this same race, *chlororhyncha*, plentiful in the Maldiv Islands in early July (1958, JBNHS 55: 216). Cumming's record from the Makran Coast of Baluchistan was shown by Ticehurst (1940, JBNHS 32: 89) to be erroneous, but this shearwater may well turn up along the coast of West Pakistan.

BREEDING. For breeding biology see Murphy 1936, and Murphy, Niedrach & Bailey 1954: 30.

MUSEUM DIAGNOSIS. For details of plumages, races, etc. see Murphy 1951: 1-21; Hachisuka 1932: 253.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	274-290	c. 36-39	c. 45-48	149-161 mm.

COLOURS OF BARE PARTS. Iris dark brown. Bill dull fleshy or dusky greenish. Legs and feet fleshy white (Baker).

10. **Slenderbilled or Short-tailed Shearwater.** *Procellaria tenuirostris* Temminck

Procellaria tenuirostris Temminck, 1835, Pl. Col., livr. 99: text to pl. 587

(Seas north of Japan and shores of Korea = Japan)

Baker, FBI No. 2197, Vol. 6: 304 [= *Puffinus tenuirostris tenuirostris* (Temminck)]

OTHER NAMES. Mutton-bird, Whale-bird.

SIZE. Pigeon; length *c.* 33 cm. (13 in.).

FIELD CHARACTERS. Pelagic.

Adult. *Above*, dark sooty brown, crown and primaries nearly black. *Below*, paler and greyer with grey chin and throat and greyish under wing-coverts.

STATUS, DISTRIBUTION and HABITAT. Once obtained near Ormara on the Makran Coast, Baluchistan, in May 1889 mistakenly reported (JBNHS 12: 767) as *P. chlororhynchus* (cf. above). Another example picked up dead on the south coast of Ceylon in May 1949 (Phillips 1951, SZ 26: 151). Both these doubtless blown in by SW. Monsoon gales. Breeds on islands in the neighbourhood of Tasmania and southeastern Australia. Ranges northward to Korea and Japan, and to Behring Straits and western coasts of North America.

MUSEUM DIAGNOSIS. For description of plumages, biology, etc. see Murphy 1936: 673-6.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	258-280	31-34	49-52	80-85 mm. (Baker)

COLOURS OF BARE PARTS. Iris brown. Bill blackish brown, tinged with olive. Legs and feet purplish black, with outer toes and outer side of tarsus black.

11. **Mauritius Shearwater.** *Procellaria lherminieri bailloni* Bonaparte

Procellaria nugax a. bailloni Bonaparte, 1857, Consp. Av., 2: 205

(ex Insula Franciae = Mauritius)

Not in Baker, FBI

LOCAL NAME. *Hoogula* (Maldives).

SIZE. Pigeon —; length *c.* 30 cm. (12 in.).

FIELD CHARACTERS. Pelagic.

Adult. *Above*, sooty black with greyish neck, the grey extending to sides of breast. *Below*, white; under tail-coverts black or black-and-white. Sexes alike.

STATUS, DISTRIBUTION and HABITAT. Breeds in the Maldiv Islands. Extralimitally also in Mauritius, Réunion, Rodriguez, Seychelles, etc. Ranges in the tropical Indian Ocean, but strangely enough not yet obtained in coastal Ceylon or western India.

MIGRATION. ?

GENERAL HABITS. Like other petrels, spends most of the non-breeding season at sea. Glides swiftly close to the surface skimming over the waves

in a wandering course on extended motionless wings interrupted by a few rapid strokes, often lowering legs and paddling or 'walking' along the water. Turns and twists from side to side in flight flashing the white breast intermittently, like sand plovers in a flock. Ranges widely over vast expanses of ocean, returning at the appointed season to its specific breeding islands.

FOOD. Small fish, squids, and other surface-floating animals; refuse thrown overboard, etc.

VOICE and CALLS. Unrecorded in India.

BREEDING. Gregarious. *Season*, in Maldives apparently between October and January, or later; said by the islanders to continue throughout the year. Burrows were found to contain eggs and young on 29 December (Gadow in Gardiner 1903); also between 26 and 31 January (1958, Phillips & Sims, JBNHS 55: 201). *Nest*, a burrow excavated in sand beneath roots of scrub, within six metres of the shore; particularly numerous on small uninhabited islets. The birds visited the burrows only at night, between midnight and 4 a.m. *Eggs*, white; one measured 49×35 mm. Clutch size? Incubation period? (Both the incubation and nestling periods are inordinately protracted in shearwaters and petrels.) Presumably, as in other petrels, both sexes incubate.

MUSEUM DIAGNOSIS. For description of plumages etc. of nominate race *lherminieri* see Murphy 1936: 684-7. *Bailloni* differs from it only in details. It differs from the more northerly occurring race *persica* (see below) in being somewhat smaller with a shorter bill, and in the greyish of the neck extending to sides of breast. (See also Palmer 1962, 1: 198.)

MEASUREMENTS. Specimens from Maldives, Seychelles, Réunion measure: 7 ♂ ♀ Wing 181-198 (av. 191.7); bill (nostril to tip) 21-23 (av. 21.6) mm. Specimens collected at Aden, and on the Makran and western India coasts (*P. l. persica*) measure: 4 ♂ ♀ Wing 199-210 (av. 204.5); 5 ♂ ♀ bill (nostril to tip) 25-27 (av. 25.6) mm.

COLOURS OF BARE PARTS. Iris dark brown. Bill slate, ridge of culmen and tip black. Legs and feet slate-blue (livid flesh in juv.), back of tarsus and outer toe black, middle of webs and joints dusky (Witherby).

12. **Persian Shearwater.** *Procellaria lherminieri persica* (Hume)

Puffinus persicus Hume, 1873, Stray Feathers, 1:5

(at sea between Gwadar and Muscat)

Baker, FBI No. 2200, Vol. 6: 306

SIZE. Pigeon —; length c. 31 cm. (12 in.).

FIELD CHARACTERS. Similar to *P. l. bailloni* but somewhat larger and with a longer bill. Less grey on neck and with a narrow white ring round eye and a white streak behind it. Difficult to distinguish unless in the hand. (See measurements under *P. l. bailloni*.)

STATUS, DISTRIBUTION and HABITAT. Arabian Sea coasts between Aden and Karachi. Common and abundant in the Persian Gulf and the Gulf of Oman, and on the Makran Coast. Breeding stations unknown; may lie off the Makran Coast or the Straits of Hormuz as suggested by Meinertzhagen (1954: 441).

Two specimens (Wing 201 and 212 mm.) have been taken on the Bombay Coast in the SW. monsoon season, doubtless storm-blown, and one in Kerala (JBNHS 16:14). The racial identity of the last is undetermined.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	185-209	c. 38	31-33	87-103 mm. (Baker)

COLOURS OF BARE PARTS. Iris brown. Bill dusky brown, bluish at the base and most of lower mandible. Legs and feet pinkish white; outer part of tarsus and outer toe including web black, variable in extent.

Genus *BULWERIA* Bonaparte

Bulweria Bonaparte, 1843 (1842), Nouv. Ann. Sci. Nat. Bologna 8:426.

Type, by monotypy, *Procellaria bulwerii* Jardine & Selby

Very closely allied to *Procellaria* but considerably smaller and of a more or less uniformly slate colour. Feet weaker; tail comparatively longer. Nostrils on top of culmen forming two quite separate round holes, this portion somewhat soft.

13. **Mascarene Black Petrel.** *Bulweria aterrima* (Bonaparte)

Procellaria aterrima 'Verr.' — Bonaparte, 1857, Consp. Av., 2:191

(ex Insula Borbonica, Afr. occ. = Réunion)

Not in Baker, FBI

OTHER NAMES. Réunion Petrel, Mascarene Gadfly Petrel.

SIZE. Pigeon +; length c. 36 cm. (c. 14 in.).

FIELD CHARACTERS. Pelagic.

Adult. Above and below dark grey-brown or sooty black, with wedge-shaped tail. Bill short, stout, black. 'Feet dark reddish flesh colour; outer toe and webs black' (Alexander 1955). Dimorphic: dark and light colour phases. Has been likened to a huge swift flying low and fast over the surface of the sea.

STATUS, DISTRIBUTION and HABITAT. Indian Ocean from the Mascarene Islands north to the Gulf of Aden. Doubtfully breeding on Réunion Island c. 21°0'S., 55°30'E.

A live specimen (storm-blown?) taken by fishermen at Bombay, 15 June 1940, identified at Colombo Museum (JBNHS 42:193). Unfortunately the skin cannot be traced for rechecking; therefore the record must stand unconfirmed till fresh specimens come to hand.

13a. **Jouanin's Gadfly Petrel.** *Bulweria fallax* Jouanin

Bulweria fallax Jouanin, 1955, L'Oiseau 27:160

(at sea, approximately 12°30'N., 55°E.)

Not in Baker, FBI

OTHER NAME. Jouanin's Black Petrel.

SIZE. Pigeon — ; length *c.* 29–30 cm. (12 in.).

FIELD CHARACTERS. Pelagic.

Adult. *Above* and *below* brownish black with long wedge-shaped tail and a short, thick bill. Sexes alike.

STATUS, DISTRIBUTION and HABITAT. Probably breeds in burrows on islands such as Kuria Muria off eastern Aden, Socotra, or Abd-el-Kuri. Found commonly in the Arabian Sea and the Gulf of Aden throughout the year. Bailey and Bourne (1963, JBNHS 60: 258) report that they handled several examples of this species that came aboard an aircraft carrier at 16°49'N., 55°15'E. and 18°50'N., 57°50'E. on 14 February 1960, and 11°24'N., 57°05'E. on 25 May in the central Arabian Sea off the mouth of the Gulf of Aden.

GENERAL HABITS. Unknown, but has been observed feeding alone far from land.

FOOD. One of the birds handled by Bailey (Bailey & Bourne, loc. cit.) vomited a small squid.

BREEDING. Unknown, but probably some time between October and March.

MUSEUM DIAGNOSIS

MEASUREMENTS

Wing	Bill	Tarsus	Tail	Wingspan
240	29	32	125	790 mm.

COLOURS OF BARE PARTS. Bill black. Feet flesh-coloured with black outer edges to the legs and toes.

13b. **Bulwer's Gadfly Petrel.** *Bulweria bulwerii* (Jardine & Selby)

Procellaria bulwerii Jardine & Selby, 1828, Ill. Orn., 2. pl. 65 (Madeira)

Not in Baker, FBI

OTHER NAMES. Bulwer's Petrel, Bulwer's Black Petrel.

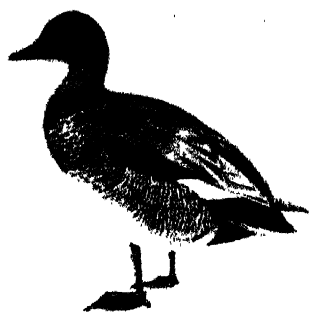
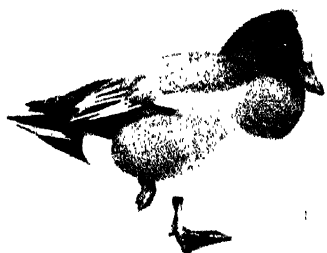
SIZE. Pigeon — ; length *c.* 26.5–28 cm. (10½–11 in.).

FIELD CHARACTERS. A small brownish black gadfly petrel, rather paler on chin and edges of greater wing-coverts, with a short, slim bill, short legs, and a long, wedge-shaped tail.

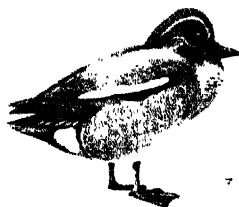
PLATE 1

1 *Anas penelope*, Wigeon (103). 2 *Anas s. strepera*, Gadwall (101). 3 *Anas c. crecca*, Common Teal (94). 4 *Anas acuta*, Pintail (93). 5 *Anas querquedula*, Garganey (104). 6 *Anas clypeata*, Shoveller (105). 7 *Aythya fuligula*, Tufted Duck (111). 8 *Aythya nyroca*, White-eyed Pochard (109). 9 *Podiceps c. cristatus*, Great Crested Grebe (3). 10 *Podiceps r. capensis*, Little Grebe (5).

Ducks all ♂♂ in summer (breeding) plumage



2



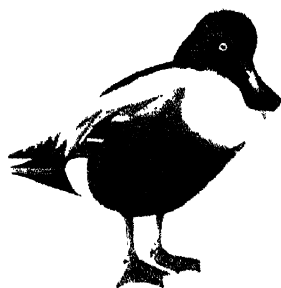
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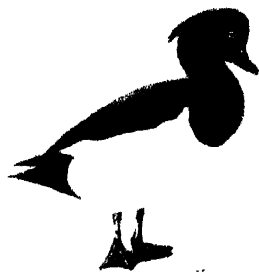
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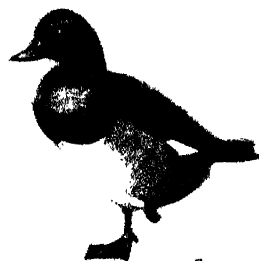
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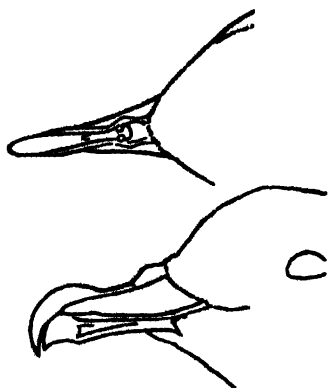


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Am. Mus. Nat. Hist.
1907



Bill of *Bulweria bulwerii*, $\times c. 1$

MUSEUM DIAGNOSIS

MEASUREMENTS

Wing	Bill	Tarsus	Tail
200	21	27	110 mm.

COLOURS OF BARE PARTS. Bill black. Legs mainly pink; feet flesh-colour, outer toes and webs black.

Family HYDROBATIDAE: Storm Petrels

The smallest sea birds, closely related to Shearwaters, up to about Myna size (c. 25 cm. or 10 in.), of blackish or greyish plumage, mostly with a white rump. Wings long; tail medium to long; neck short. Bill slender, of medium length, grooved, hooked at tip. Nostrils tubular with a single orifice. Legs slender, medium to long; feet webbed, mostly black. Webs black or particoloured. Sexes alike.

Genus OCEANITES Keyserling & Blasius

Oceanites Keyserling and Blasius, 1840, Wirbelth. Eur. 1: xciii, 131, 238. Type, by subsequent designation, *Procellaria wilsonii* Bonaparte = *Procellaria oceanica* Kuhl

Size small. Bill slight, and shorter than head; the orifice of the combined nostrils single. Wings very long and narrow: 2nd primary (as.) longest. Tail moderate, slightly forked. Tibia partly naked; tarsi smooth, much longer than toes. Hind toe only represented by a minute claw. Basal phalanx of middle toe not flattened; shorter than the other phalanges plus claw. Claws sharp, spatulate, but little flattened.

The genus ranges through the southern oceans and into the North Temperate

14. **Wilson's Storm Petrel.** *Oceanites oceanicus oceanicus* (Kuhl)

Procellaria *oceanica* Kuhl, 1820, Beitr. Zool. Abth., 1: 136 pl. 10, f.1.

(No type locality. South Georgia designated by Murphy,

1928, Bull. Am. Mus. Nat. Hist., 38: 128)

Baker, FBI No. 2194, Vol. 6: 300

OTHER NAMES. Mother Carey's Chicken, Yellow-webbed Storm Petrel.

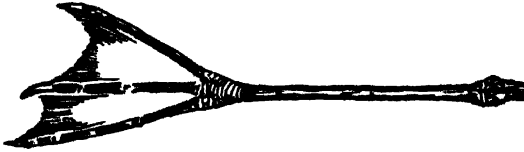
SIZE. Bulbul; length c. 19 cm. ($7\frac{1}{2}$ in.).

STATUS, DISTRIBUTION and HABITAT. Pelagic. Breeds on islands off the coast of China; the Bonin Islands, Vulcan Islands, the western Hawaiians and Marquesas Islands in the Pacific Ocean. Also breeds on Madeira, the Salvages, Canary and Cape Verde Islands in the Atlantic. Phillips (1959, Bull. BOC, 79: 100-101) has reported upon the occurrence of this species in the Indian Ocean, having secured a specimen in the Maldives in August, 1958.

FOOD. Probably squid, small fish, and zooplankton.

BREEDING. Eggs are known from May to July.

FIELD CHARACTERS. Pelagic. A small sooty black storm petrel with a conspicuous white patch above tail (coverts) and a pale wing-bar. Longish slender black legs with distinctive lemon-yellow webbed toes which characteristically project behind the short square tail in flight. Sexes alike.



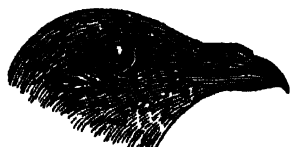
Foot, $\times 1$

Dark coloration and white rump, as well as flight, superficially reminiscent of house swift. The only storm petrel with white rump and dark underparts occurring regularly in the Indian Ocean.



$\times c. \frac{1}{2}$

STATUS, DISTRIBUTION and HABITAT. Claimed to be one of the most numerous bird species in the world, and is certainly the most wide-ranging of the storm petrels. Breeds on Antarctic and subantarctic islands wandering north in the Atlantic, Pacific and Indian oceans in summer, to Europe, Arabia, India, New Guinea, Japan, California, etc. Not uncommon along the coasts of the Persian Gulf, Makran and Sind.



× 1

Also visits coastal Ceylon chiefly during the SW. Monsoon, and has been taken at Kanyakumari (Kerala). Sinclair (1888, JBNHS) mentions it as 'known but rare' on the Konkan coast (W. India). A specimen¹ was collected within two miles of Bombay docks on 22.10.1947 when also a number of scattered birds were observed

in coastal waters a few miles southward (Abdulali, JBNHS 47: 550). This is possibly a regular seasonal occurrence but curiously enough unrecorded. H. G. Alexander noted it about 150 miles out of Bombay towards Aden on 10 September (*Ibis*, 1929: 43). Not recorded from northern parts of the Bay of Bengal, but several from the neighbourhood of Malaya.

MIGRATION. The meagre authentic records for the Indian Ocean suggest that probably the main body of birds from the Antarctic breeding grounds reaches north to Socotra and the Arabian coast in May-June, returning by way of the waters off Ceylon between September and November (Gibson-Hill 1948, JBNHS 47: 445).

GENERAL HABITS. Keeps in scattered ones and twos or small parties — sometimes large gatherings of 200 or more. Often met far out at sea flying swift-like (alternate glides and fluttering) close over the water even in a choppy sea, or riding buoyantly on the wave crests. Picks up floating animalcules from the comparatively calm troughs between the waves, getting hidden now and again behind the swell. Feeds by 'walking' or 'hopping' on the water with wings fluttering and held slightly above line of back — strangely reminiscent of a flock of jungle babblers hopping in active search of food — long legs dangling, feet paddling, head bent low and bill touching the surface.

FOOD. Mainly zooplankton.

BREEDING. In the south polar and subpolar zones in the southern summer, November to January. Nests in crevices in cliffs, under and amongst stones of screes, etc.

MUSEUM DIAGNOSIS. For details of plumage etc. see Murphy 1936, 2: 749; Baker 1929, 6: 300.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	140-157	12-14	32-36	72-84 mm. (Baker)

COLOURS OF BARE PARTS. Iris blackish. Bill dull black. Legs and feet black, with a conspicuous pale yellow patch in the centre of each web.

¹Dr C. A. Gibson-Hill who examined this specimen suggested that it might be of the Kerguelen breeding race *parvus*. But the differences between the races are so slight and the overlap in the measurements so considerable that he could not be definite. The bird measured: Wing 145; bill 18.5; tarsus 35; tail 59 mm.

Genus *FREGETTA* Bonaparte

Fregetta Bonaparte, 1855, Comp. Rend. Acad. Sci. Paris 41: 1113. Type, by original designation, *Thalassidroma leucogaster* Gould

Very close to *Oceanites*. Differs from it in having the first phalanx of the middle toe greatly flattened and longer than the other phalanges plus claw. Claws flattened, broad, spade-shaped and pointed at end.

The genus is chiefly found in the southern oceans.

15. **Duskyvented Storm Petrel.** *Fregetta tropica melanogaster* (Gould)

* *Thalassidroma melanogaster* Gould, 1844, Ann. & Mag. Nat. Hist., 13: 367
(Southern Indian Ocean)

Baker, FBI No. 2195, Vol. 6: 302

OTHER NAMES. Gould's Storm Petrel; Mother Carey's Chicken.

SIZE. Bulbul \pm ; length *c.* 20 cm. (8 in.).

FIELD CHARACTERS. Pelagic. Like Wilson's Storm Petrel sooty black above with white rump, but with underside including middle of under wings white. A black band along middle of belly through under tail-coverts. Legs shorter, all black, including webs of toes. 'The longitudinal dark band on the belly, with conspicuous white areas on either side, distinguish this storm petrel from its congeners. It is, however, surprisingly difficult to differentiate in life as it follows a ship or dances upon the ocean' (Murphy 1936, 2: 764). Flight weaker, more fluttering and bat-like; otherwise habits more or less the same as last.

STATUS, DISTRIBUTION and HABITAT. Accidental straggler. Breeds in colonies on islands in the Antarctic and subantarctic zone, e.g. Kerguelen and South Orkney. Only a single old record from our area — a specimen collected in the Bay of Bengal (*c.* 1895) by or for the Marquis of Tweeddale, now in the British Museum. The bird ranges in the seas south of Australia, but has apparently not been seen elsewhere in the Indian Ocean.

Jerdon 1864 (3: 827), mentioned that a storm petrel was not of unfrequent occurrence near the mouths of the Ganges in stormy weather, as well as in the Bay of Bengal. The species was not established, and no recent authentic identification is available.

MUSEUM DIAGNOSIS. For description of plumages, also biology, see Murphy 1936, 2: 764-7.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	158-176	14-15	<i>c.</i> 40-43	73-81 mm. (Baker)

COLOURS OF BARE PARTS. Iris brown. Bill, legs and toes (including webs) black.

Genus *OCEANODROMA* Reichenbach

Oceanodroma Reichenbach, 1853 (1852), Av. Syst. Nat.: iv. Type, by original designation, *Procellaria furcata* Gmelin

Cf. Austin, O. L., Jr., 1952, Bull. Mus. Comp. Zool., Harvard, 107: 399-401

Rather close to *Fregatta* and *Oceanites* but with deeply forked tail of 12 feathers. Tarsus about equal to middle toe plus claw. 1st primary (as.) concealed, minute and pointed; 3rd primary longest.

16. **Forktailed Storm Petrel.** *Oceanodroma leucorhoa monorhis* (Swinhoe)

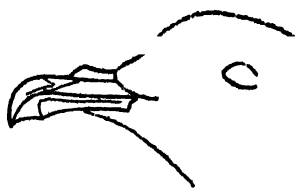
Thalassidroma monorhis Swinhoe, 1867, Ibis: 386 (Amoy, China)

Not in Baker, FBI

OTHER NAME. Leach's Storm Petrel.

SIZE. Bulbul \pm ; length c. 17-19 cm. (c. 7-7½ in.).

FIELD CHARACTERS. Pelagic. Similar in size to Wilson's but appearing a fairly uniform sooty brown, including underwing. Slightly greyer on neck and underparts, and with *dark rump* instead of white. Differs also in its distinctly forked tail, and shorter black legs and black feet. Flight similarly swallow-like but stronger than in whiterumped species described. Sexes alike.



Bill of *Oceanodroma leucorhoa*, \times c. 1

STATUS, DISTRIBUTION and HABITAT. Rare vagrant. Breeds on islets from Korea and coastal Japan south to Quelpart Island, and islets off Formosa. Winters south to Singapore. In our area only a single specimen obtained in Ceylon — an exhausted storm-driven male at Mutwal near Colombo, 3 July 1927. This was apparently misidentified by Stuart Baker as of the Californian race

socorroensis. Also a fairly reliable identification (H. H. Tomlinson) of one that came on board ship a little west of Colombo, 10 June 1923, and was examined in the hand (Gibson-Hill 1948, JBNHS 47: 447-8).

MUSEUM DIAGNOSIS. For description of plumage, measurements and other details, see Austin, 1952.

COLOURS OF BARE PARTS. Iris brownish. Bill, legs, and feet black (Palmer 1962, 1: 226).

Order PELECANIFORMES

Family PHAETHONTIDAE: Tropic-Birds

Wide-ranging tropical sea birds similar in size and superficial appearance to terns but morphologically closer to cormorants and frigate birds. Plumage in adults chiefly white and black. Head large; neck short; bill yellow or orange-red, longish, stout, slightly decurved, pointed. Wings long and pointed. Tail wedge-shaped with the middle pair of feathers in adults narrow, ribbonlike, much elongated as in the Paradise Flycatcher (*Terpsiphone*). Legs extremely short; feet webbed (connecting all 4 toes). Sexes alike. Young hatch from the egg with down. Eggs curiously like those of the raptors especially the Scavenger Vulture (*Neophron*). (For details of anatomy etc. see Baker 1929, 6: 290.)

Genus PHAETHON Linnaeus

Phaethon Linnaeus, 1758, Syst. Nat., ed. 10, 1: 134. Type, by subsequent designation,
Phaethon aethereus Linnaeus

Cf. Gibson-Hill, C. A., 1950, JBNHS 49: 67-80

Characters as of the Family. The genus is represented throughout the tropical seas of the world.

Key to the Species

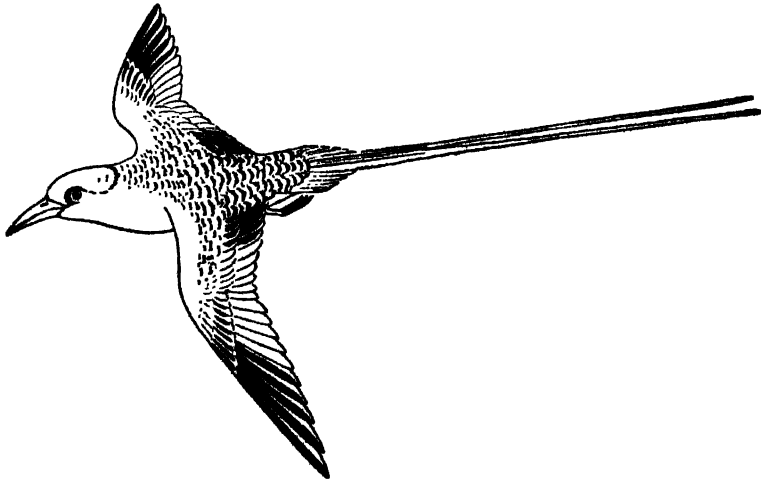
		Page
A	With elongated tail streamers.....1	
B	Without elongated tail streamers.....2	
1	Streamers red..... <i>P. rubricauda</i> (adult)	24
	Streamers white.....a	
a	Upper and lower parts white, black wing-bar, bill yellow to orange <i>P. lepturus</i> (adult)	24
	Upperparts barred with black, black wing-bar, bill red..... <i>P. aethereus</i> (adult)	17
2	Upperparts barred with black, bill black..... <i>P. rubricauda</i> (juvenal)	24
	Upperparts barred with black, bill yellow.....b	
b	With black nuchal crescent..... <i>P. aethereus</i> (juvenal)	17
	Without black nuchal crescent..... <i>P. lepturus</i> (juvenal)	24

17. **Short-tailed Tropic-bird.** *Phaethon aethereus indicus* Hume

Phaethon indicus Hume, 1876, Stray Feathers, 4: 481, 483 (Makran Coast)
Baker, FBI No. 2188, Vol. 6: 291

OTHER NAMES. Boatswain or Bos'n bird; Redbilled Tropic-bird.

SIZE. Blackheaded Gull or large tern; length c. 40 cm. (16 in.) + tail
ribbons c. 30 cm. (12 in.).



× c. 1/7

FIELD CHARACTERS. Pelagic. A predominantly white tern-like sea bird with two greatly elongated ribbons in the wedge-shaped tail as in the Paradise Flycatcher's.



× c. 1

Adult. *Above*, white finely barred with black. A black upright crescentic band in front of and through eye on each side of head. A black wing-bar conspicuous in flight. Outer primaries largely black. *Below*, including underside of wing, white with a black

horizontal patch on posterior flanks. Bright coral red bill diagnostic. Sexes alike.

Young (immature). Black-spotted crown and nape, heavier black barring on back, and no ribbons in tail.

STATUS, DISTRIBUTION and HABITAT. Northern parts of Indian Ocean. Breeds on islands off the Somali coast, and in the Straits of Bab-el-Mandeb and the Persian Gulf. Ranges widely over the ocean in the off season. Recorded at sea off the Makran coast (February), between Karachi and Gulf of Kutch (March), Bombay (February, May and July — Navarro, Rauf Ali, JBNHS 59: 649; 63: 437); also from the Laccadive Islands. A specimen secured on 3 February 1956 west of southern Ceylon (7°52' N., 77°26' E.) is apparently the first authentic record in Ceylon waters, and also the southernmost in our area (Phillips 1958, SZ 28: 184).

GENERAL HABITS. Flight tern-like but stronger and more direct with steady powerful flapping of the long, pointed wings, each flap perceptibly raising and lowering the bird in the air. Resembling the flight of a pigeon and punctuated with bouts of gliding. Usually unafraid, flying inquisitively quite close around ships far out at sea. The birds hover over a promising spot as if to take aim, and plunge headlong from a height of 30 or 40 metres on their prey, like the sea terns and boobies.

FOOD. Mainly fish and squids. Flying fish have often been taken from crops of specimens.

VOICE and CALLS. Loud, monosyllabic, rather finch-like (Phillips); 'incessant screams while circling around ship' (E. H. Aitken).

BREEDING. *Season.* March/April recorded in the Persian Gulf. A single egg laid under shelter of a ledge of rock or in a crevice. Often nests gregariously. Incubation period c. 28 days.

For breeding biology of the species see Stonehouse 1962: 124-61.

MUSEUM DIAGNOSIS. For details of plumage etc. see Baker, loc. cit.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail (including streamers)
♂ ♀	281-301	55-60	25-28	215-301 mm.

COLOURS OF BARE PARTS. Iris dark brown. Bill orange-red to dusky red, the tip, edge of commissure and nareal groove blackish. Legs and feet yellow or yellowish white, the anterior toes and webs between them black (Baker).

18. **Redtailed Tropic-bird.** *Phaethon rubricauda rubricauda* Boddaert*Phaethon rubricauda* Boddaert, 1873, Table Pl. enlum.: 57 (Mauritius)

Baker, FBI No. 2189, Vol. 6: 292

Plate 5, fig. 1, facing p. 96

SIZE. Blackheaded Gull \pm or large tern; length *c.* 36 cm. (14 in.) + tail with streamers *c.* 48 cm. (19 in.).

FIELD CHARACTERS. Pelagic. A tern-like sea bird, predominantly silky white, with black streak through eye, black shafts to wing and tail feathers, and two long, somewhat stiff narrow bright *red* streamers in wedge-shaped tail which project spike-like rather than trail ribbon-like in flight. Sexes alike.

STATUS, DISTRIBUTION and HABITAT. Breeds on Mauritius, Assumption, and the Aldabra group of islands. Ranges widely in the tropical western Indian Ocean. Vagrants reported from the Bay of Bengal several times, but not collected and determined racially. May belong to the Christmas Island and Cocos-Keeling breeding population *westralis* Mathews.

GENERAL HABITS. Like other tropic-birds, usually met far out at sea, singly or in pairs — not gregariously. Does not follow ships for scraps, but often circles round close above them inquisitively and unafraid, and then moves on. Flight more buoyant than of the Short-tailed species.

MUSEUM DIAGNOSIS. For details of plumages etc. see Baker, loc. cit.; Mathews and Iredale 1921: 80.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail (including streamers)
♂ ♀	330-339	66-69	30-33	360-428 mm. (Baker)

COLOURS OF BARE PARTS. 'Iris dark brown; eyelids black. Bill bright orange-red, paler or slightly brownish at the base, with a small black bar on the plane of the nostril. Legs and proximal one-third of the toes pale mauve or bluish white, with the distal two-thirds of the web black' (Gibson-Hill 1950).

19. **White Tropic-bird.** *Phaethon lepturus lepturus* Daudin*Phaethon lepturus* Daudin, 1802, Buffon Hist. Nat., ed. Didot., Quadr., 14: 319 (Mauritius)

Baker, FBI No. 2190, Vol. 6: 293

OTHER NAME. Yellowbilled Tropic-bird.

SIZE. Blackheaded Gull \pm or large tern; length *c.* 38 cm. (*c.* 15 in.) + tail with streamers *c.* 45 cm. (18 in.).

FIELD CHARACTERS. Pelagic. A white tern-like sea bird with orange-yellow bill and upright crescentic black spot in front of eye continued behind as a black streak through it to nape. In flight, a broad black band from shoulder to shoulder across upper surface of wings conspicuous, interrupted in the middle by the white back. Black wing tips. Two very long white streamers (central tail-feathers) broader and more pliant (ribbon-like) than in the red-tailed species. At close range adult distinguishable from adult *indicus* by unbarred back. Sexes alike.

STATUS, DISTRIBUTION and HABITAT. The typical race breeds in the Mascarene, Seychelles, Maldiva, Andaman, and Cocos-Keeling islands. Sight records for seas off Ceylon; 4 specimens taken on the island's west coast in Colombo Museum (Phillips 1953, Checklist: 3). Ranges over the tropical Atlantic, Pacific, and Indian oceans in several races.

GENERAL HABITS. Like other tropic-birds usually met with singly on the high seas. Has the same pigeon-like flight. Only seldom settles on water. For an excellent account of its biology see Murphy 1936: 802-7.

BREEDING. *Season*, in the Red Sea and Persian Gulf islands (?) May, June, and July (Baker); in the Maldiva Islands apparently the cool months November to January (adult, nestling, and eggs collected on Mahlosmadulu Atoll in November, and full-fledged juveniles on Tuladu Island in January — Phillips & Sims 1958, JBNHS 55 (2): 202).

For breeding biology see Stonehouse 1962: 124-61.

MUSEUM DIAGNOSIS. For description of plumages etc. see Murphy 1936: 802-3.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	252-282	44-51	21-23	Central feathers up to 575, generally c. 450 mm. (Baker)

COLOURS OF BARE PARTS. ' ♂ ♀ Iris dark brown; eyelids black. Bill yellowish grey, almost grey at the base with a dark grey line through the nostril. Legs and feet jet black, except for the inner toe and a small patch in the inner web which are a very light blue-grey, almost white ' (Gibson-Hill 1950).

Family PELECANIDAE: Pelicans

LOCAL NAMES (for all species): *Hāwāsil* (Hindi); *Bellua*, *Birwa* or *Bherwa* (Bihar); *Ganggoya*, *Gangaber*, *Garapolo* or *Gorapullo* (Bengal); *Chinkabatu* (Telugu); *Deohāns*, *Dhera*, *Bhela* (Assam); *Uphong* (Manipur); *Pas boruwa*, *Pasbara* (Sinhala); *Kūlākēda* (Tamil, Ceylon); *Pen* (Sind; Kutch); *Kotumpannom* (Malayalam).

Large gregarious clumsy-looking birds with short stout legs and large fully webbed feet. Tarsus compressed, reticulate in front. Bill long, heavy, the upper mandible flattened and hooked at tip, the lower consisting of two narrow flexible arches, underhung throughout its length by a capacious gular pouch of loose naked skin. Nostrils obsolete, concealed in grooves running the whole length along either side of culmen. Wings large and broad, 2nd primary (as.) longest. Tail short, square, soft. The extensible pouch serves as a dip- or landing net for scooping up fish, and when nesting on the ground or in trees in the hot sun as a cooling device for dissipating moisture and promoting evaporation by constant pulsation. The skeleton of hollow bones is particularly light weighing less than a kilogram to the total body weight of about 12 kilograms. Thus in spite of some little effort in the initial take-off from the surface, particularly in a following wind, the birds can fly strongly and for long distances to and from their fishing grounds, and when migrating. They fly with the neck bent back in a flat S, head drawn in between the shoulders, the large broad wings beating the air powerfully and steadily with a whistling sound. The flat-keeled underside of the body is beautifully streamlined for buoyant flight and is reminiscent of the float of a flying boat. When alighting on the water the birds

make full use of their wings and tail to check momentum, at the same time throwing out their broadly webbed feet well forward to act as friction brakes against the water. Pelicans fly either in the characteristic V-shaped echelons of geese, or in long straggly ribbons with a wide front. The birds are much given to soaring on thermals, and flocks may commonly be seen in the middle of a hot day sailing on outspread motionless wings with upturned tips, in graceful circles high up in the blue, by themselves or in company with storks and vultures.

The birds frequent large freshwater lakes and jheels, and brackish lagoons. Their food consists almost exclusively of fish, some of considerable size being taken. A single bird is estimated to consume as much as 2 kg. per day. While the greater part of the fish perhaps consist of species of small economic worth, which are always in the majority, pelicans occasionally do some damage to commercial fisheries also. The method of fishing is by cooperative effort, a flotilla of birds swimming in a semicircle, or from bank to bank across an arm of a lake, vigorously splashing on the water with their large wings to drive a school of fish into the shallows. They do not dive for their prey like cormorants, but merely sail or rush into the shoal with bills open and lower mandible trailing in the water, or head completely submerged, the enormous skin bag acting as a landing net for the quarry which is swallowed by an upward jerk of the bill. Only the American Brown Pelican normally plunges from the air on fish like the sea terns or gannets. When satiated the birds waddle on to the shore to rest and preen and digest, before resuming the hunt.

The oil obtained from pelicans' fat is highly valued in Indian medicine as an embrocation for rheumatism and similar ailments.

DISTRIBUTION. Temperate and tropical America, Africa, Asia, Europe, Australia. Some species migratory.

VOICE. Syringeal muscles responsible for true voice-production, lacking. Adults usually silent; rarely uttering throaty grunts or croaks likened to the grunt of a buffalo. Young have a variety of groans, yelps and chattering.

Genus PELECANUS Linnaeus

Pelecanus Linnaeus, 1758, Syst. Nat., ed. 10, 1:132. Type, by subsequent designation, *Pelecanus onocrotalus* Linnaeus

Characters as of the Family.

Key to the Indian forms

	Page
A White with black primaries, bill and pouch yellow to orange.....1	
B General coloration grey, no black in wings, bill flesh with blue spots, pouch dull purple..... <i>P. p. philippensis</i> (adult)	29
C Pale brown above, white below..... <i>P. p. philippensis</i> (juvenal)	29
D Brown to dingy white, irregularly speckled with brown.....2	
1 Feathers of forehead end in a point..... <i>P. onocrotalus</i> (adult)	27
Feathers of forehead end in a transverse concave line..... <i>P. p. crispus</i> (adult)	30
2 Feathers of forehead end in a point..... <i>P. onocrotalus</i> (juvenal)	27
Feathers of forehead end in a transverse concave line..... <i>P. p. crispus</i> (juvenal)	30

20. **White or Rosy Pelican.** *Pelecanus onocrotalus* Linnaeus

Pelecanus onocrotalus Linnaeus, 1758, Syst. Nat., ed. 10, 1:132. (Africa, Asia)
Baker, FBI No. 2176, Vol. 6:270

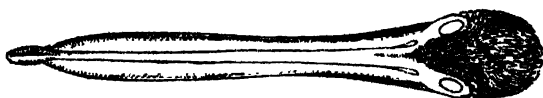
LOCAL NAMES. See under Family.

SIZE. Vulture \pm ; length c. 183 cm. (72 in.).

FIELD CHARACTERS.

'Adult. Plumage mostly white, tinged with rose colour, with a tuft of yellowish feathers on the breast; primaries and some of the secondaries black; slight crest on the back of the head; feathers of the forehead ending in a point above the bill. Sexes alike; female smaller.

A



B



Feathers of forehead of (A) *P. onocrotalus* and (B)

'Young' (immature). Pale buffish brown above, somewhat mottled; primaries brown; underparts white with no rosy tinge' (Alexander 1955: 174).

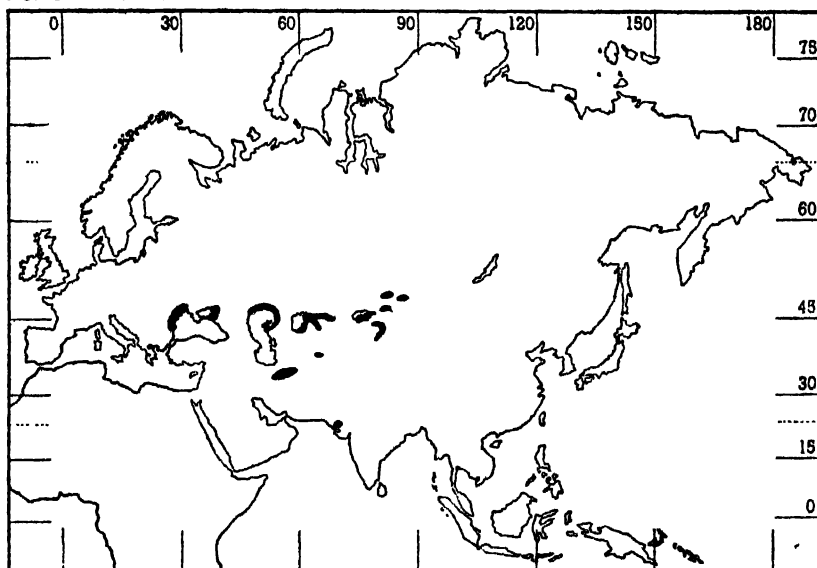
STATUS, DISTRIBUTION and HABITAT. Resident, at least in part; first discovered breeding in the Great Rann of Kutch in 1960 (Sálim Ali 1960, JBNHS 57: 414). Mainly winter visitor to W. Pakistan (Baluchistan, Sind) and N. India from the Punjab to Assam (U.P., Rajasthan, Kutch, Saurashtra N. Gujarat). Andhra (Visakhapatnam)?, and 'Madras' (?). Often vast congregations on large jheels and lagoons.

Extralimital. Breeding from Hungary to the lakes of central Asia, south to Iraq and the Persian Gulf (Bubiyan Island off Fao). Wintering in N. Africa, Asia and through Burma, Malaysia to E. China.

BREEDING. *Season.* February to April in the Great Rann of Kutch where several hundred pairs were first found in 1960 nesting among old worn-down flamingo nests on the periphery of the occupied 'City'. *Nest*, a skimpy to fairly substantial bed of large white feathers (the birds' own, and flamingos') close together, about one nest per square metre. On 21 March most nests contained two eggs or young each (some 3 or 4), from naked newly hatched chicks to hefty squabs in down, a fortnight or more old. *Eggs*, ivory white with a smooth gloss, not chalky-textured like flamingo eggs, about the same size but slightly broader. Average of 25 Kutch eggs

95.56 × 61.65 mm.; of 14 from Persian Gulf, *vide* Baker, 88.3 × 57.5 mm. Chicks when newly hatched, naked glossy-skinned, dark flesh-coloured, changing to blackish in 3 or 4 (?) days. Turn blacker when feather papillae appear and the down and quills sprout. Bill, bill-pouch, and legs funereal black. Down of the larger squabs dull sooty black in striking contrast with the snowy white of the tree-nesting *P. philippensis* (q.v.). The larger squabs are enormously fat and ugly; when approached they herd together and waddle off with an ungainly, unsteady gait. On fright the Kutch chicks disgorged an astonishing quantity of fish (mainly *Cyprinodon dispar*) some fully 25 cm. long and weighing 500 to 600 gm. each.

Pelecanus onocrotalus



■ Breeding range

MUSEUM DIAGNOSIS. See Hartert 1912-22, 2: 1402.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	700-730	430-450	c. 130-140	190-210 mm.
♀♀	640-680	390-400		

COLOURS OF BARE PARTS. Iris red to crimson. Bill plumbeous blue, mottled with whitish along the centre, with the nail and edges of both mandibles red; lower mandible blue on the basal, yellow on the terminal half. Pouch, face and orbital skin yellow, brighter in the breeding season. Legs and feet fleshy pink; webs yellow (Baker).

[Details of a freshly killed specimen, Bharatpur, 2. 1. 1952.

Ad. ♂ Wing 745; bill (from skull) 435; tarsus 152; tail 163(?) mm.

Weight 11 kg. Iris yellow. Facial skin pale magenta-flesh (pink). Bill: a plumbeous-blue stripe along ridge of culmen, c. 2.5 cm. (1 in.) wide at forehead, narrowing

to c. 1.25 cm. ($\frac{1}{2}$ in.) near tip. Similar tapering lateral bands on either side of culmen and lower mandible for c. 25 cm. (10 in.) from gape; tip of bill (nail) pale cherry-red paling to a yellowish horn point. Pouch lemon-yellow. Legs and feet pale creamy grey. Pouch held c. 4 kg. of fish, some 25 cm. long.]

21. **Spottedbilled or Grey Pelican.** *Pelecanus philippensis philippensis* Gmelin

Pelecanus philippensis Gmelin, 1789, Syst. Nat. 1(2): 571 (Philippines = Manila, *vide* Stresemann 1952, Ibis 94: 514)

Pelecanus roseus Gmelin, 1789, Syst. Nat. 1(2): 570. (Manila, P.I.)

Baker, FBI No. 2179, Vol. 6: 274

Plate 2, fig. 1, facing p. 32

LOCAL NAMES. See under Family.

SIZE. Vulture +; slightly smaller than White Pelican. Length c. 152 cm. (60 in.).

FIELD CHARACTERS. Without black in wings.

Adult. Head, neck, and upperparts grey; underparts greyish white, the under tail-coverts mottled with brown; under wing-coverts and under tail-coverts tinged with vinaceous in summer; lower back, rump, and flanks tinged vinaceous in winter; a crest on the back of the head, composed of elongated brown feathers tipped with white; bill flesh-coloured with blue spots on the upper mandible; pouch dull purple with bluish black markings; feet dark brown. Sexes alike.

'The grey colouring which includes wings and tail, at once distinguishes this species' (Alexander 1955: 176).

Young (immature), pale brown above, white below.

STATUS, DISTRIBUTION and HABITAT. Resident and locally migratory, in well watered tracts in both Pakistans, all India, and Ceylon. Breeds in Ceylon, Madras (Tirunelveli and Chingleput districts), Andhra (West Godavari district), Assam (Kaziranga Wildlife Sanctuary) and doubtless elsewhere in suitable localities. Affects large jheels, brackish lagoons, and tidal estuaries.

GENERAL HABITS, etc. See under Family.

BREEDING. Gregarious, often in traditional sites in mixed colonies with egrets, cormorants, etc. *Season*, in Ceylon December to March/April, at Aredu-Sarepalle, a few miles from Kolleru Lake in Andhra—the largest pelicanry known in India—chiefly October to March. *Nest*, a massive structure 60–75 cm. across, roughly circular, 30 cm. or more thick, on branches of *Pithecelobium*, mango, and other large trees, or on palmyra (*Borassus*) and coconut (*Cocos*) palms. On a thick foundation of twigs are bedded large quantities of rice straw from nearby newly harvested fields making the finished nest appear as though entirely made of that material. Sodden decaying water weeds and reed stems also used along with or instead of straw. Nests on palms built at base of the more or less horizontal stems of lowest leaves, the nests touching one another in a continuous untidy ring platform. Pilfering of material from neighbouring nests common. Nests constantly added to most of the time. *Eggs*, 3 or 4, chalky white becoming

stained and dirty in course of incubation; long to moderate ovals, nearly equal at both ends. Average size of 50 eggs 78.8×53.4 mm. (Baker). Both sexes incubate and also feed the young. In contrast with the White Pelican, the chicks when a few days old are covered with *snow-white* down. A great deal of noise prevails in a colony with groaning and yelping by the hungry chicks and throaty grunts and bill-clapping by the adults. Chicks feed by thrusting complete head into capacious bill-pouch of parent, flapping their wings ecstatically. Incubation period *c.* 30 days (Lamba 1963, *Pavo* 1: 110-19). Period from laying of egg to flying of young about five months. (For an excellent account of the Aredu-Sarepalle pelicanry in Andhra see K. K. Neelakantan 1949, JBNHS 48 (4): 656-66, and for photos E. P. Gee 1960, *ibid.* 57: 245-51.)

MUSEUM DIAGNOSIS. See Baker, *loc. cit.*; Robinson and Chasen 1936: 239.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♂	530-607	324-355	86-98	168-196 mm.
♀ ♀	525-550	285-308	75-86	

COLOURS OF BARE PARTS. Iris white to pale yellow, clouded with brown. Bill pinkish flesh or yellowish flesh with a row of bluish black spots on each side near the edge; the nail and terminal half of both mandibles orange, the lower mandible with bluish blotches near the centre. Pouch dull purple blotched with bluish black. Naked (facial) skin orange-yellow, livid in front of the eye. Legs and feet very dark brown or blackish (Baker).

22. Dalmatian Pelican. *Pelecanus philippensis crispus* Bruch

Pelecanus crispus Bruch, 1832, Isis, Col. 1109 (Dalmatia)

Baker, FBI No. 2178, Vol. 6: 273

LOCAL NAMES. See under Family.

SIZE. Vulture +; same as White Pelican. Length *c.* 183 cm. (72 in.).

FIELD CHARACTERS.

Adult. Very similar to White Pelican, also mainly white with black primaries, and difficult to distinguish from it in the distance. Colour of legs and feet *dark grey* instead of pink; and forehead feathers ending in a *concave crescentic line* instead of a pointed wedge, best diagnostic clues. In flight dusky-white undersurface of wings distinguishes it from White Pelican. Sexes alike.

Young (immature) brownish grey above; white below. Pouch greyish.

STATUS, DISTRIBUTION and HABITAT. Breeds in SE. Europe, Asia Minor, Iran, N. China, SE. Mongolia. Winter visitor to N. Africa and our area: recorded in Baluchistan, Sind, Punjab, Kutch, Rajasthan (?), Saurashtra, N. Gujarat, Oudh, Bihar, Orissa (?), Bengal, Assam. Not in the Deccan, S. India or Ceylon. Flocks on large rivers, jheels, and coastal lagoons.

GENERAL HABITS, etc. See under Family.

MUSEUM DIAGNOSIS. For plumages see Naumann 1905, 11: 24.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	720-800	400-450	116-122	220-230 mm.
♀♀	680-720	360-380		

(Baker)

COLOURS OF BARE PARTS. Iris white or yellowish white. Bill plumbeous grey, the nail and edges of both mandibles yellow over the apical half. Cheeks, orbital skin, and pouch, pale yellowish or creamy flesh-colour, the last deepening into orange-red in the breeding season. Legs and feet pale bluish grey or plumbeous.

MISCELLANEOUS. In Sind the Mohanas or inland fishermen use captive tethered pelicans as decoys. They also use the skin stretched over a frame as a helmet for stealthily approaching ducks and coots in water with bodies submerged, and capturing them by pulling them under by their legs one by one.

Family SULIDAE: Boobies

Sea birds of the size of large ducks, e.g. Brahminy, to larger than geese. Body stout, neck of moderate length, wings long and pointed, tail rather long and wedge-shaped. Bill stout, conical, pointed, and slightly downcurved at tip, but not hooked. Nostrils obsolete. Legs short and stout, feet large and fully webbed. Plumage typically white in adults with the primaries or entire wing black; also the tail in some species. Bill, and bare facial and gular skin, brightly coloured. Sexes alike or nearly so.

The majority of species live in the tropical seas. Boobies can be readily identified in the distance by their characteristic habit, shared with tropic-birds and sea terns, of plunging headlong into the water from a height of 8 to 17 metres in the air for fish. The large size and absence of streamers in the tail distinguishes them from both the others. That they are capable of very deep dives in pursuit of fish is shown by the fact that a booby was found entangled in a fishing net set 27 metres below the surface. They breed on oceanic islands, on the ground or in stick nests in trees.

For further details see Murphy 1936: 827-9; Witherby 1940, 4: 14; Palmer 1962, 1: 280.

Genus *SULA* Brisson

Sula Brisson, 1760, Orn. 1: 60; 6: 494. Type, by tautonymy, *Sula* Brisson = *Pelecanus piscator* Linnaeus

Characters as of the Family.

Key to the Indian forms

	Page
A Plumage white above and below, primaries black.....	1
B Lower breast and belly lighter than rest of plumage.....	2
C Plumage uniformly dull brown above, paler below, with faint dark band across chest.....	<i>S. sula rubripes</i> (juvinal) 33
D Head, neck, wings, and foreparts dark; belly and tail white.....	<i>S. sula rubripes</i> (brown phase) 33
1 Trailing edge of wing broadly edged with black, tail black	<i>S. dactylatra melanops</i> (adult) 32

		Page
	Trailing edge of wing narrowly edged with black, tail white.....	
 <i>S. sula rubripes</i> (adult)	33
2	Lower breast, belly, and under tail-coverts pure white; head, neck, and rest of upperparts deep brownish black; under wing-coverts with broad white stripe.....	
 <i>S. leucogaster plotus</i> (adult)	34
	Lower breast, belly, and under tail-coverts whitish mixed with brown; head, neck, and rest of upperparts dull chocolate to fuscous; under wing-coverts with or without pale stripe.....	
a	Under wing-coverts with pale stripe.....	
 <i>S. leucogaster plotus</i> (juvenile)	34
	Under wing-coverts without pale stripe.....	
 <i>S. dactylatra melanops</i> (juvenile)	32

23. **Masked Booby.** *Sula dactylatra melanops* Heuglin

Sula melanops Heuglin, 1859, Isis, 351, pl. 10, f. 2 and 3

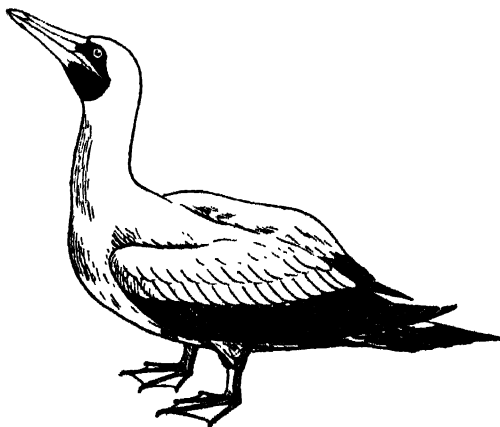
(Burda-Rebschi, Somali Coast)

Baker, FBI No. 2187, Vol. 6: 288 (*personata* ?)

OTHER NAMES. Bluefaced Booby; White Booby.

SIZE. Barheaded Goose +; length c. 80 cm. (32 in.).

FIELD CHARACTERS. The largest of the boobies.

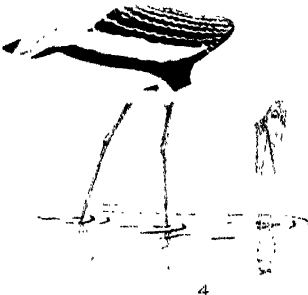
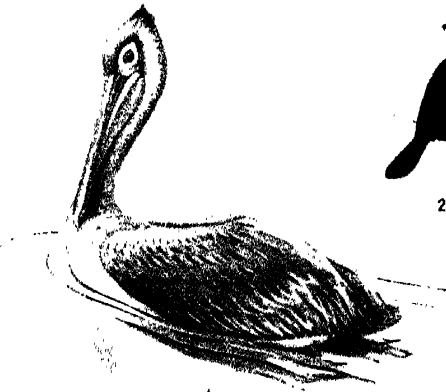


× c. $\frac{1}{10}$

Adult. Mainly white: wing quills, greater wing-coverts, and tail-feathers chocolate-brown; bill blue-grey, greenish yellow, yellow, or red; naked skin of face and throat (the mask) blue-black; feet yellow, orange, greenish blue, or slaty blue.

PLATE 2

1 *Pelecanus p. philippensis*, Spottedbilled Pelican (21), imm. 2 *Phalacrocorax niger*, Little Cormorant (28). 3 *Phalacrocorax c. sinensis*, Large Cormorant (26). 4 *Ibis leucocephalus*, Painted Stork (60). 5 *Threskiornis melanocephala*, White Ibis (69). 6 *Anhinga r. melanogaster*, Darter (29). 7 *Anastomus oscitans*, Openbill Stork (61). 8 *Giconia e. episcopus*, Whitenecked Stork (62). 9 *Leptoptilos dubius*, Adjutant Stork (67). 10 *Xenorhynchus a. asiaticus*, Blacknecked Stork (66).



A. Hughes

Young (immature). 'Head and neck dark brown; upperparts greyish brown' (Alexander 1955: 182).

STATUS, DISTRIBUTION and HABITAT. Common out at sea off the Sind and Makran coasts, at Ormara Head and elsewhere (Ticehurst, 1923, *Ibis*: 460). Occasionally blown in on the western seaboard during the monsoon gales. Obtained thus at Karachi, Bombay, Cannanore, and Ceylon (Kalutara and Putalam, on west coast). Once as far inland as Nasik, 112 km. NE. of Bombay (Sálim Ali 1958, JBNHS 55: 358). The Ceylon specimens have been recorded as of the Australasian race *personata*; but the races are not readily distinguished, especially in brown juvenile plumage, and geographically they are more likely to belong to this, the SW. Indian Ocean population. Sight record from the Maldive Islands (Phillips & Sims, 1958). Breeds on Socotra, Mait, and other islands off the Somali Coast, on Rodriguez and Farquhar islands near Mauritius, and on Seychelles, etc. Perhaps also in the Kuria Muria group off the Oman coast (Arabian Sea).

GENERAL HABITS. The plunging habit needs clear water in which prey can be spotted at some depth, therefore the birds usually avoid the muddy littoral. During the plunge the conspicuous dark tail is fanned out as a rudder. For breeding biology of the species see Dorward 1962: 174-200.

FOOD. Chiefly squids and flying fish.

MUSEUM DIAGNOSIS. See Murphy 1936: 846-7.

MEASUREMENTS. (*personata*)

	Wing	Bill	Tarsus	Tail
♂ ♀	419-452, nearly always over 430	103-114	c. 54-58	c. 180-200 mm. (Baker)

COLOURS OF BARE PARTS. Iris yellow; for rest see Field Characters (above).

24. Redfooted Booby. *Sula sula rubripes* Gould

Sula rubripes Gould, 1838, Syn. Bds. Austr., app. pt. 4: 7

(New South Wales, Raine Island, northern Queensland)

Baker, FBI No. 2185, Vol. 6: 286

OTHER NAME. Redlegged Gannet.

SIZE. Large gull; length c. 41 cm. (26 in.).

FIELD CHARACTERS.

'Adult. Plumage mainly white, tinged with buff; primaries blackish brown; tail pale greyish brown; under wing-coverts mostly grey; bill light blue with brown tip and red base; naked skin of face blue, of throat black; feet red.'

'Young (immature). Plumage generally dull brown. In intermediate plumage, in which the bird often breeds, the head and underparts are lighter brown than the back and wings, whilst the rump, tail, and upper and under tail-coverts are white.' (Alexander 1955: 181-2.) Many other puzzling colour phases besides, not entirely explainable by age.

Adult distinguishable from adult Masked Booby by small size, whitish tail *contra* chocolate-brown, and red feet *contra* slaty.

STATUS, DISTRIBUTION and HABITAT. Breeds on many tropical islands in the Indian Ocean, e.g. Christmas Island, and in the western and central

Pacific. Ranges widely over the warm seas in these areas. Hume identified a flock on the Laccadive Islands (Baker 1929, 6: 287). A specimen (storm-blown?) taken in Ceylon in July (1936) in the neighbourhood of Colombo. According to Jerdon, 1864, occasionally seen in the Bay of Bengal, where Blyth later 'described it as 'common'. However in the British Museum there is only a single specimen actually collected in the Bay of Bengal.

GENERAL HABITS. The flight resembles that of a large shearwater. The birds hunt in groups of five to fifteen strung out in single file, flying with strong regular wing strokes low over the surface, plunging from the air and chasing the quarry under water. Most fishing done in the evening or early hours of the night. Sometimes gatherings of three or four hundred birds over a large shoal of fish. Unlike other boobies, nests chiefly in bushes and trees.

FOOD. Mainly squids (cephalopods), and fish. For more details of bionomics see Murphy 1936: 861-70; Gibson-Hill 1947: 115-19.

MUSEUM DIAGNOSIS. See Murphy 1936: 861-2.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	403-421	90-97, once 88	c. 40-43	219-228 mm. (Baker)

COLOURS OF BARE PARTS. Iris dark brown; rest as under Field Characters. Further details in Gibson-Hill, 1947: 116.

25. **Brown Booby.** *Sula leucogaster plotus* (Forster)

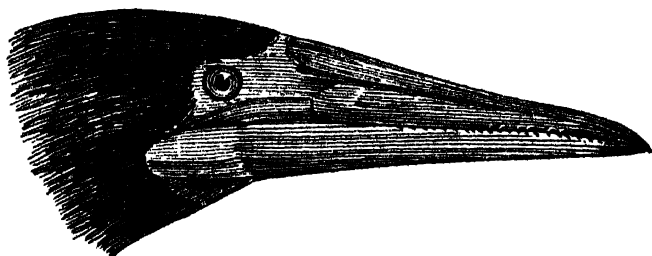
Pelecanus plotus Forster, 1844, Descr. Anim., ed. Licht.: 278 (near New Caledonia)
Baker, FBI No. 2184, Vol. 6: 285

OTHER NAMES. Brown Gannet; Common Booby.

SIZE. Large gull; length c. 76 cm. (30 in.).

FIELD CHARACTERS. The commonest booby in most tropical seas.

Adult. *Above*, dark chocolate-brown; primaries blackish. *Below*, neck and upper breast chocolate-brown; rest white including undersurface of black-margined wings. Sexes alike; male somewhat smaller.



< c. 1/2

Young (immature) largely dusky brown; difficult to distinguish from other species in immature plumage.

STATUS, DISTRIBUTION and HABITAT. Breeds on islands in the Indian and Pacific oceans, e.g. Christmas and North Keeling. Occurs uncommonly in the Bay of Bengal. A specimen has been taken on 'the Malabar Coast'. Recorded several times from the west coast of Ceylon during the NE. monsoon. Also on the Maldive and Laccadive islands.

GENERAL HABITS. Usually seen singly or in small groups of up to a dozen birds or so. Rather more solitary in its hunting than the Redfooted Booby. Like others of the family catches its food — mainly flying fish and squids (cephalopods) — by diving from 25 to 35 metres up in the air and subsequent underwater pursuit. Nests on the ground in the open, on sea cliffs etc.

For an excellent account of its bionomics see Gibson-Hill 1947: 109-15.

MUSEUM DIAGNOSIS. For plumages etc. see Murphy 1936: 854 for the nominate race *leucogaster* from which *plotus* differs only in details. Also Gibson-Hill 1947, 1950.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
5 ♂♂	392-398 (av. 395.2)	96-101	41-45	198-210 mm.
4 ♀♀	406-426 (av. 417.5)	102-107	44-45.5	204-227 mm.

COLOURS OF BARE PARTS. Iris (both sexes) grey; eyelids dull blue. Bill: ♂ light greenish grey, ♀ slightly paler with tip almost white. Facial, ramal, and gular skins: ♂ dark purple, ♀ light greenish yellow often with a slightly darker patch in front of and below the eye. Legs and feet: ♂ pale arsenic green, ♀ pale yellowish green (Gibson-Hill 1950: 235).

Family PHALACROCORACIDAE: Cormorants and Darter

Gregarious, fish-eating, colonial-nesting water birds. All our Indian species are characterized by black plumage, whence collectively known in Hindi as *pān-kowwa* or *jāl-kowwa* (water-crow).

Bill laterally compressed, rather long, slender and pointed; hooked at tip in cormorants, stiletto-like in the darter or snake-bird. Nostril obsolete. A gular pouch in cormorants, naked anteriorly. Neck and body long, rather spindle-shaped; wings of moderate length. Tail long and stiff. Legs short; feet large, pelecaniform, with all four toes united in a web for swimming; claws much curved. Sexes alike. Stance of bird when perched on tree or rock more or less upright.

Plumage less dense or resistant to water than in ducks and many other swimming and diving birds. Becomes permeated by prolonged immersion and requires constant drying out.

Further morphological details in Stresemann 1927-34, Aves: 804, 875; Van Tyne & Berger 1959: 401; Witherby 1940, 4: 1-2.

Within our area found mainly on inland waters — jheels, rivers, irrigation reservoirs, etc. Rarely also on brackish lagoons and tidal creeks. Expert divers. Unlike grebes, swimming under water with use of wings, literally flying beneath the surface, in pursuit of fish. The flight of cormorants, with neck stretched out in front, is powerful, sustained, and rather goose-like in profile as well as head-on, but the birds rise with some difficulty, flapping heavily along the surface to get airborne. When alighting on the water, the long stiff tail is first to break the surface and helps to check momentum.

BREEDING. In mixed colonies or heronries with storks, egrets, herons, ibises, etc. *Nests*, skimpy to fairly substantial stick platforms lined with water weeds in trees, rarely on rocks. *Eggs*, 2 to 6, pale blue or pale green overlaid by a chalky layer. Incubation by both sexes. Young nidicolous, naked at hatching, down-covered later; extraordinarily ugly throughout. Fed by both sexes by regurgitation, the chick inserting its head into the parent's gullet, wrestling vigorously with its wings flapping, and not letting go till the parent breaks off with an effort. Nestlings beg excitedly by shaking and swaying their upraised scrawny necks from side to side and tickling the parent's bill to induce disgorgement.

Adults commute long distances to forage for the voracious insatiable young, flying out and back all together in goose-like V-shaped echelons or wavy diagonal lines — a common sight at heronries in the mornings and evenings.

Cormorants are notorious for their prodigious appetites, and their depredations on local fish populations can be potentially devastating. Nevertheless, the wholesale indiscriminate persecution of the birds on this account, without a proper scientific inquiry, is unjustified. Investigations on the food and feeding habits of these and other piscivorous birds elsewhere have shown that the majority of fishes taken are of low economic worth, or which themselves often constitute a far greater menace to the spawn and fry of valuable food fishes than the birds.

Key to the Indian forms

	Page
A Large (c. 80 cm.=32 in.); glossy black above and below, flanks white..... <i>Phalacrocorax carbo sinensis</i> (breeding)	37
B Mostly smaller; glossy black above and below, flanks not white....1	
C Plumage darker above than below.....2	
D Plumage lighter above than below.....3	
1 Throat speckled, head and neck black, yellow gular skin, head not crested (c. 57-63 cm.=23-25 in.)	
..... <i>P. fuscicollis</i> (winter)	39
Throat black, patches of white feathers or plumes on head, with or without yellow gular skin, head noticeably crested.....a	
Throat white, no markings on sides of head, with or without yellow gular skin	b
a Pure white tufts of feathers on each side of neck behind ear-coverts, yellow gular skin (c. 57-63 cm.=23-25 in.).....	
..... <i>P. fuscicollis</i> (breeding)	39
Scattered silky white plumes on forecrown and sides of head, no yellow gular skin (c. 51 cm.= 20 in.)	
..... <i>P. niger</i> (breeding)	41
b Yellow gular skin (c. 80 cm.=32 in.)	
..... <i>P. carbo sinensis</i> (winter)	37
Yellow gular skin lacking (c. 51 cm.=20 in.).....	
..... <i>P. niger</i> (winter)	41
2 Brown above and paler brown or whitish below.....c	
c Dull brown above, more or less white below, yellow gular skin, wing over 310 mm..... <i>P. carbo sinensis</i> (juvenal)	37
Scaly brown above, whitish below, flanks mottled brown and white, chin and throat white, foreneck brown with white streaks,	

	Page
wing over 250 mm. but under 300 mm.....	
..... <i>P. fuscicollis</i> (juvenal)	39
3 Snake-like neck, straight pointed bill, pale brown head and neck, blackish feathers of upperparts streaked with silver brown, underparts dark brown or blackish.....	43
Underparts paler.....	43

Genus PHALACROCORAX Brisson

Phalacrocorax Brisson, 1760, Orn. 1: 60. Type, by tautonymy, *Phalacrocorax* Brisson =
Pelecanus carbo Linnaeus

General characters as of the Family. Bill moderately long, rather slender and compressed; culmen rounded and sharply hooked at end, with a narrow groove on each side, bifurcating at the dertrum or nail, the lower branch running down to the commissure. A gular pouch, naked anteriorly. Wing of moderate length: 2nd primary (as.) usually longest. Tail rounded or wedge-shaped, of 12 or 14 very stiff feathers. Tarsus short and compressed; toes flattened; claws much curved.

Genus cosmopolitan; represented within our limits by three species. (See Key, above.)

26. **Large Cormorant.** *Phalacrocorax carbo sinensis* (Shaw)

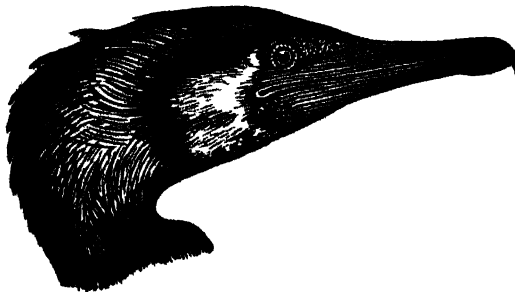
Pelecanus sinensis Shaw, 1801, Nat. Misc. 13: pl. 529, text (China)
Baker, FBI No. 2180, Vol. 6: 277

Plate 2, fig. 3, facing p. 32

LOCAL NAMES. *Ghogur*, *Pān-kowwa*, *Jāl-kowwa* (Hindi); *Wādū silli* (Sind); *Neiār* (Kashmir); *Bontakāki* (Telugu); *Di dao-kwa* in Cachar, *Pāni kaori*—all cormorants—in Nowgong (Assam); *Pān-kawri*, for cormorants and shag (Bengal).

SIZE. Large duck; length c. 80 cm. (32 in.).

FIELD CHARACTERS. A thick-set duck-like black water bird with a slender bill, hooked at tip, and longish stiff tail. Swims low on water with only the longish neck and a thin slice of the back showing. Settles on rocks, sandbanks, and trees with an upright carriage. Often seen thus with wings and tail spread out to dry.



× c. ½

Adult (breeding). *Above and below black with metallic bluish or greenish sheen, with a broad white patch on posterior flanks. Head, crest, and neck,*

more or less mixed with silky white feathers. Facial skin and throat white; gular pouch bright yellow.

Large size, white sides of face, yellow gular pouch, and white oval thigh patches diagnostic at rest as well as in flight.

In winter (non-breeding) plumage the hoariness of the head and neck, and the white thigh patches disappear; the yellow gular pouch becomes less bright. Then differentiated from our other cormorants chiefly on size.

Young (1st year). Dull brown above; more or less white below, progressively becoming browner and then blacker everywhere. Fully adult breeding plumage apparently attained in the fourth year.

STATUS, DISTRIBUTION AND HABITAT. Resident and locally migratory, practically throughout our area. In Kashmir, Ladakh and Nepal on lakes at considerable elevations (e.g. Satpur in Baltistan, 11,300 ft. (c. 3450 m.) Meinertzhagen), and on the rivers debouching into the plains, and far up their gorges. Right across the Gangetic Plain to eastern Assam, south through the Peninsula, and in Ceylon. Ticehurst's observations at Karachi (*Ibis* 1923: 458) suggest that there may be a regular seasonal influx of extralimital migrants in winter, augmenting the resident population.

Frequents large inland waters — Himalayan torrents and lakes, and lowland rivers, jheels, irrigation reservoirs, etc. Also tidal lagoons and salt pans.

Extralimital. From Holland through central and southern Europe to central Asia; Burma, Thailand, Indochina and Malaysia to China. The species, in several geographical races, is found in North America, Europe, Asia, northern Africa, and Australia.

GENERAL HABITS. Usually met with in ones and twos, or small flocks of up to 8 to 10; seldom bigger. But very large congregations collect to breed at traditional heronries such as Keoladeo Ghana in Bharatpur (Rajasthan). Hunts fish by diving and underwater pursuit. From the surface, where the bird swims low down on the water, only the neck showing and the body almost completely submerged, it takes a little upward leap before plunging to dive, often remaining below for many seconds at a time. Sometimes joins in the concerted community hunts of its smaller relatives. When satiated, has been observed to dive and catch a catfish about 15 cm. long and play with it as a cat does with a mouse. The bird swam ashore with the fish, dropped it struggling on the bank, picked it up again and carried it back into the water, released it and dived after it, caught it again and brought it ashore, then leisurely repeated the whole performance several times before swallowing it. Normally silent in the non-breeding season. See also under Family.

For courtship display and general bionomics see Witherby 1940, 4: 2-10.

FOOD. Almost exclusively fish.

BREEDING. Gregoriously in many localities throughout the country, the larger heronries becoming traditional and resorted to year after year. *Season*, mainly between September and February dependent on the monsoons, the filling up of jheels, and the availability of fish supply for the young. Recorded as follows: Sind (Eastern Narra dist.), November; N. India (Bharatpur), September-December; Madras (Vedanthangal), January-February; Assam (Subansiri river), December; Ceylon (North-

central Province), December. *Nest*. An untidy, comparatively massive deepish platform of twigs about 50 cm. in diameter, lined with water weeds etc. Built colonially, often in mixed heronries cheek by jowl with its own species and other water birds, the nests sometimes touching one another. Usually, however, a tendency to segregation into discrete *mohallas* is noticeable. Normally in trees standing partially submerged, but an unusual colony of hundreds of nests on ledges of rocks flanking the Subansiri river in Assam is described by Baker 1935 (4: 425-8). *Eggs*, 3 to 5, sometimes 6, long ovals, more or less equal at both ends, pale blue-green in colour, overlaid with a white chalky layer, becoming stained and dirty during incubation. Average size of 100 eggs 60.6×39.3 (Baker). Incubation period 23-24 days. Both sexes partake in incubation and feeding the young. As in all cormorants, the hatchling is extraordinarily ugly — naked at first, covered with black down a few days later. According to Heinroth five weeks in nest; full fledged at two months. Nestlings demand food from incoming parent by violently worrying and tickling — 'attacking' — its yellow throat-patch to the accompaniment of a persistent wheezy *chooe, chooe, choee* — almost a whistle.

MUSEUM DIAGNOSIS. For details of plumages, moults, etc. of the nominate race see Witherby 1940, 4: 5-7, 10.

In breeding plumage our race *sinensis* differs from the above (of the northern Holarctic Region) by its head and neck being much whiter. In winter plumage the two are indistinguishable in the field.

	Wing	Bill	Tarsus	Tail
♂ ♀	319-364	57-72 mm.	[62-71	140-155 mm. (Baker)]

COLOURS OF BARE PARTS. Iris green; eyelids dusky yellow. Bill dark horny brown, the lower mandible except the tip pinkish- or yellowish-white. Skin of pouch black and yellow, patched in varying degree, occasionally all yellow. Legs and feet black.

MISCELLANEOUS. Longevity (*P. c. carbo*) from ringing data, 18 + years (*Ring*, 33: 148 — 1962).

27. **Indian Shag.** *Phalacrocorax fuscicollis* Stephens

Phalacrocorax fuscicollis Stephens, 1826, in Shaw's Gen. Zool. 13 (1): 91 (Bengal)
Baker, FBI No. 2181, Vol. 6: 279

LOCAL NAMES. Same as for the preceding, often with a prefix meaning small.

SIZE. Duck +; length *c.* 63 cm. (25 in.).

FIELD CHARACTERS. Smaller than the preceding.

Adult (breeding). *Above*, glistening bronze-black. *Below*, shiny jet black. A pure white tuft of feathers on each side of neck behind ear-coverts, and a few white specks on head. On closer view, in good light scalloped or scaly effect on back and wings (produced by darker edging to the feathers) perceptible. In non-breeding plumage distinguished from Large Cormorant chiefly on size; from Little Cormorant by bigger size, yellow gular skin, and white-speckled throat. Sexes alike.

Young (immature). *Above*, scaly bronze-brown, tail and primaries blacker. *Below*, chiefly white, with the flanks mottled brown and white.

The three species are difficult to distinguish in the field in non-breeding plumage, without size comparison, and sometimes liable to be confused *inter se*.

STATUS, DISTRIBUTION and HABITAT. Resident, moving locally with conditions of water and fish supply, throughout the subcontinent from Sind in W. Pakistan to eastern Assam, south through the Peninsula, and in Ceylon. Not in the Himalayas except in the foothills where the larger rivers debouch into the plains. May occur in the peninsular and South Indian hills on the newly constructed dammed reservoirs among the Small Cormorants usually present there.

Frequents jheels, rivers, irrigation tanks, tidal estuaries, etc. by itself or in company with either or both the other cormorants. Abundant in Karachi harbour at certain times of the year.

Extralimital. Burma south to Tenasserim.

FOOD. Mainly fish.

GENERAL HABITS. As of the Family (q.v.). More gregarious than the Large Cormorant, oftener seen in flocks of large size and in association with its smaller relative, the two species frequently hunting together. The communal hunt, or battue, consists of a party of the birds hemming in a shoal of fish, or intercepting it as it gushes from the sluice gate of an irrigation reservoir, diving feverishly with little upward leaps and chasing the fish under water. Great havoc is wrought amongst the quarry as one bird after another plunges after them with energy, each to reappear presently with a struggling silvery form held crosswise in the bill. This is quickly shifted into position and swallowed head foremost with an upward jerk of the bill; presently the bird dives once more. The manoeuvre is repeated again and again till the birds are sated, when they will sit about on a sandbank or on rocks or trees in the characteristic upright posture, wings and tail spread open to dry, preening themselves and waiting for appetite to return.

BREEDING. *Season*, overall July to February; as in the preceding and in allied water birds generally, depending on early or late monsoon rainfall and local water conditions. Usually August to October in northern India; November to February in the south and in Ceylon. *Nest*, an untidy platform of twigs, rather like a crow's nest, sometimes scantily lined with grass roots and water weeds. Built in trees either in small colonies of its own or — as in Keoladeo Ghana (Rajasthan) — in enormous mixed heronries or 'rookeries' covering an extensive area of swamp with the partially submerged trees loaded down with thousands of nests and hundreds of thousands of water birds of numerous species — all three cormorants, darters, storks, herons, etc. There are often 30 to 50 nests of cormorants and other species in a single moderate-sized tree, closely packed and tier upon tier, the lower ones soon getting befouled and caked with the rain of excreta from above. *Eggs*, 3 to 5 or 6, pale bluish green with a chalky surface, smaller replicas of the Large Cormorant's. Average size of 100 eggs 51.3×33.2 mm. (Baker). Both sexes incubate. Incubation period not recorded. Chicks naked at hatching, soon becoming clothed in sooty black down.

MUSEUM DIAGNOSIS. See Key (above) and Baker, loc. cit.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	257-276	50-61 generally 54-58	c. 47-52	132-144 mm.

COLOURS OF BARE PARTS. Iris green or blue-green. Bill dark brown, base of lower mandible reddish horny, gular skin yellow; naked skin of face black-purplish in the breeding season, yellowish at other times. Legs and feet black (Baker).

28. **Little Cormorant.** *Phalacrocorax niger* (Vicillot)

Hydrocorax niger Vicillot, 1817, Nouv. Dict. Hist. Nat. 8: 88 (East Indies = Bengal)
Baker, FBI No. 2182, Vol. 6: 280

Plate 2, fig. 2, facing p. 32

LOCAL NAMES. *Pān kowwa*, *jogrābi* (Hindi); *Pān kawri* also for shag (Bengal); *Neetikāki* (Telugu); *Kādāl kāgām*, *Neer kāgām* (Tamil); *Diya kawa* (Sinhala); *Kākātārāvu* (Malayalam).

SIZE. Jungle Crow +; length c. 51 cm. (20 in.).

FIELD CHARACTERS. Smaller size, comparatively shorter bill and longer tail, and absence of yellow on gular skin distinguish it from the Shag. Size difference perceptible only when the two seen together.

Adult (breeding). Black overall with a bluish or greenish sheen. Upper back and wing-coverts dark silvery grey, scalloped with black. A short crest on occiput and nape and a few scattered silky white feathers and plumes on forecrown and sides of head. In non-breeding plumage crest and white feathers in head disappear, and throat becomes white. Sexes alike.

Young (immature). *Above*, brown, the back with paler scalloping. *Below*, paler, with throat and centre of abdomen white.

Chick (c. one week old). Head bald shiny livid red, with naked scrawny neck. Body covered with dingy black down.

STATUS, DISTRIBUTION and HABITAT. Resident, with local movements depending on water conditions. Found through the subcontinent and in Ceylon. Absent in the Himalayas and northern West Pakistan. Affects jheels, rivers, irrigation reservoirs and canals, village tanks, tidal estuaries, etc.

Extralimital. Burma, Thailand, Indochina, Malaysia, Indonesia east to the Greater Sunda Islands.

GENERAL HABITS. As of the Family (q.v.) and very similar to the preceding, with which it commonly associates and is frequently confused. Solitary birds, or twos and threes on village tanks and tidal estuaries, to great flocks on the larger inland waters, and enormous congregations at the traditional rookeries, e.g. Keoladeo Ghana in Rajasthan and Vedanthangal in Madras State. When not on water, usually seen perched upright on trees, stakes, or rocks, sunning themselves, wings and tail spread open. In the feverish jostling during the communal hunts, in which densely packed rabbles participate, the birds often leap-frog over their fellows in their eagerness to plunge after a shoal of fish—manoeuvres reminiscent of starlings at a swarm of grasshopper nymphs.

FOOD. Mainly fish; to a lesser extent also tadpoles, frogs, and crustaceans.

BREEDING. *Season*, chiefly July to September in W. Pakistan and N. India; November to February in the south; December to May in Ceylon. *Nest*, an untidy stick platform about 25 cm. in diameter indistinguishable from that of the Shag, as also are the eggs though somewhat smaller. Average size of 100 eggs 44.8×29.0 mm. (Baker). Normal clutch 3 to 5. The nest is too small to contain the full complement of young when fairly grown. When an observer approaches a nest-tree these crowded youngsters, as well as brooding birds from adjoining nests, tumble plumb down into the water beneath, scraping through the thorny branches. The adults dive, or flap and patter along the surface to take off with the usual effort. The young soon manage to clamber back into the nest-tree using their pliant feet with the sharp hooked claws, the chin, and the stumpy wings to support and pull themselves up the branches. In addition to nesting in enormous mixed colonies at swamps, sometimes in multitudes dense enough to blacken acres of denuded trees, the Little Cormorant also nests singly and in smaller numbers on trees standing high and dry in the midst, or on the outskirts, of inhabited villages at considerable distances from water, in the usual company of Cattle and White egrets. Baker found an exceptional breeding colony in a swampy reed-bed in Assam. Here the nests were placed about 1.5 metres above the water on masses of broken-down elephant grass, the colony being completely screened from view by the tall growth. Both sexes partake in nest-building, incubation and care of the young. Incubation period not recorded. The marked disparity in growth of chicks of the same brood suggests that the eggs are laid at longer intervals than 24 hours and that incubation commences with the first egg. Brooding from the first egg must also serve to protect the clutch from nest marauders like the House Crow which is a very serious menace at heronries all over the country.

MUSEUM DIAGNOSIS. For plumages see Baker, loc. cit.; Robinson and Chasen 1936, 3: 246.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	181-205 (once 212)	29-34	35-40	133-146 mm.

COLOURS OF BARE PARTS. Iris green. Bill horny brown, blackish at tip, livid purple at base. Gular and orbital skin black (non-breeding), purple (breeding). Legs and feet blackish, tinged with purple flesh colour when breeding (Baker).

28a. Pygmy Cormorant. *Phalacrocorax pygmaeus* (Pallas)

Pelecanus pygmaeus Pallas, 1773, Reise versch. Prov. Russ. Reich, 2: 712, pl. G
(Caspian Sea)

Not in Baker, FBI

LOCAL NAMES. None recorded.

SIZE. Little Cormorant \pm .

FIELD CHARACTERS. In winter doubtfully distinguishable from Little Cormorant, see Museum Diagnosis.

STATUS, DISTRIBUTION and HABITAT. Rare vagrant (?) to West Pakistan. A single specimen in the BNHS collection (o? 3. ix. 1917, Gujar, Mashki, 165 m. SSW. of Kalat, Baluchistan — J. E. B. Hotson) is the only record for our area (JBNHS 62(3): 553).

Extralimital. SE. Europe, Black and Caspian Seas, Middle East, Afghanistan, Russian Turkestan, Algeria, Tunisia.

GENERAL HABITS. Similar to Little Cormorant.

BREEDING. Extralimital.

MUSEUM DIAGNOSIS. As for Little Cormorant, but feathers of scapulars and upper wing-coverts graphite grey, fringed or scalloped with black. *Winter*, glistening black with white throat and rusty brownish breast. *Summer* (breeding), head dark rusty brown.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	200–207	28–31	c. 36	140–147 mm.
Outer toe with claw c. 53–56 mm.				

(Hartert)

COLOURS OF BARE PARTS. Iris dark brown (not green), sometimes almost blue-black. Legs and feet black.

Genus ANHINGA Brisson¹

Anhinga Brisson, 1760, Orn. 1: 60, 6: 476. Type, by tautonymy and monotypy

Anhinga Brisson = *Plotus anhinga* Linnaeus

Bill slender, straight, very sharp-pointed with both margins of commissure toothed near tip. No lateral groove; nostrils small, basal and linear. Neck very slender with a bend or kink at the 8th and 9th vertebrae. Wing pointed: 3rd primary (as.) longest. Scapulars elongate and lanceolate. Tail long, cuneate in shape, of 12 stiff feathers.

29. Darter or Snake-bird. *Anhinga rufa melanogaster* Pennant

Anhinga melanogaster Pennant, 1769, Indian Zool.: 13, p. 12 (Ceylon and Java)

Baker, FBI No. 2183, Vol. 6: 282

Plate 2, fig. 6, facing p. 32

LOCAL NAMES. *Pānwa*, *Pān dūbi* (Hindi); *Silli* (Sind); *Goyār* (Bengal); *Pāmūbātū* (Telugu); *Chakuri* (Southern Gonds); *Pāmūttāra* (Tamil, Ceylon); *Diya kawa*, *Belli kawa* (Sinhala); *Maniori*, *Begiagir* (Assam).

SIZE. Duck +; length c. 90 cm. (36 in.).

FIELD CHARACTERS. A black water bird like the cormorant, with longer, slenderer snake-like neck, narrow head, and straight, pointed stiletto-shaped bill. Tail long, stiff, fan-shaped.

Adult. *Above* black, the back and wings longitudinally streaked and speckled with silver-grey; head and neck velvety chocolate-brown

¹ Treated by some authors under a separate family, Anhingidae, by others in a subfamily of Phalacrocoracidae (Anhinginae), or merely a genus as here

with white chin, throat, and a narrow white line from behind eye halfway down each side of neck. *Below*, shiny black. Sexes alike.

Young (immature). *Above*, dark brown, head and neck paler (whitish), mantle narrowly and dully streaked with rufous and silver-grey. *Below*, brown; tail tipped paler.

STATUS, DISTRIBUTION and HABITAT. Resident, with local movements depending on water conditions. Found throughout the subcontinent from W. Pakistan to E. Assam (from c. 300 m. in the Himalayas), southward through the Peninsula, and in Ceylon.

Frequents inland waters — swamps, jheels, rivers, irrigation reservoirs, village ponds, etc.

Extralimital. Burma, Thailand, Indochina, Malaysia, Celebes (Sulawesi). Other races in Africa, Madagascar, Middle East.

GENERAL HABITS. Keeps singly, in scattered twos and threes, or large congregations, depending on living conditions. More individualistic than cormorants, and does not hunt in cooperative bands. Swims with body submerged, only the snake-like head and neck showing above the surface, constantly turning from side to side. An expert diver and underwater swimmer using the feet to propel itself in pursuit of prey, wings held half open. Unlike cormorants (and grebes) does not leap upward before plunging to dive; merely stretches neck horizontally and quietly vanishes below surface leaving hardly a ripple. When chasing fish under water, sways neck back and forth like a javelin-thrower poised to throw. A special structure in the vertebrae of the neck enables the sharp bill to be shot out as by a powerful spring. The quarry is transfixed on the stilett-like upper mandible. It is jerked off smartly when the bird surfaces, shaken into position, and swallowed head foremost. Though needing some initial effort in the take-off, flies strongly with quick flaps punctuated with sailing, tail spread fanwise, and slender neck with the characteristic kink in the middle stretched in front. When satiated perches upright on a tree-top or snag like cormorants, sunning itself with outspread wings and tail. As in cormorants, and strangely enough for such specialized aquatic birds, the plumage is permeable to water and needs constant drying. Occasionally spirals up on a thermal to lofty heights and circles on motionless wings along with storks and pelicans, obviously for fun.

When a tree on which darters are resting is approached, the birds hurl themselves into the water below, dragging through the intervening tangle of thorny branches as if shot dead. They go right under, but presently the snake-like necks reappear one by one in the distance. It is possible that some of such birds may be moulting their wing quills and temporarily flightless (see Moults).

VOICE. Seldom heard except when nesting, a loud disyllabic *chigi, chigi*, etc. recalling the beginning of a guinea-fowl's cackle; and various grunts and croaks besides. Nestlings also very noisy when begging food.

FOOD. Almost exclusively fish, including some seemingly much too large for the bird's slender bill and gullet.

BREEDING. *Season.* June/July to December in W. Pakistan and N. India; November to February in the south; January to March in Ceylon. *Nest*, a largish twig platform built on trees standing in or near water, often

gregariously, among large mixed heronries, e.g. Keoladeo Ghana, Rajasthan, the nests almost touching one another on the overcrowded trees. *Eggs*, 3 to 6, elongated, spindle shaped, pale greenish blue with a whitish chalky coating, becoming soiled and dirty during incubation. Average size of 80 eggs 52.9×33.5 mm. (Baker). Both sexes partake in incubation and feeding the young. Incubation period unrecorded. As in the Little Cormorant, there is great disparity between nestlings in the same brood. Incubation commencing with the first egg is of survival value against nest-robbers like House Crows, and also against the fierce midday sun. Chicks blind and naked when hatched, except for some straggly down on head. White down acquired in a few days, persists on head, neck, and underparts even after wing and tail quills sufficiently grown for chicks to fly. Feeding by regurgitation, the bill and head of chick being thrust violently into parent's gullet.

On arrival of foraging parent at nest, the chicks jostle for food, upstretching neck, vigorously shaking and swaying it in a kind of St Vitus's dance, and tickling the parent's throat. Parent lowers and opens bill wide, allowing chick to thrust its entire head into the elastic gullet. The irritation within apparently induces a retching effect, helping parent to bring up food. The swaying and tugging extraction process lasts for several seconds, the parent having to back away forcibly from the importunate young. Several visits by both parents needed to satisfy the voracious brood. Nest young also require frequent quenching of thirst. Water is squirted in jets from parent's bill into gullet of chick, sometimes spilling outside in the process. On fright chicks, even when quite small, disgorge the food they have eaten into the water below like hailstones, sometimes even hurling themselves bodily as well. Many of the smaller chicks perish through inability to swim and to clamber back to the nest. Adolescents usually manage to do so, using their pliant feet and sharp-hooked claws, chin and neck, and the stumpy forelimbs to haul themselves up the trunk and branches, becoming gory in the process if the nest tree happens to be a thorny one such as babool or *Prosopis*.

At the Keoladeo heronry in Rajasthan heavy predation of nestlings is caused by Pallas's Eagle (*Haliaeetus leucoryphus*), a few pairs of which are permanently established there. They appear to specialize in darter squabs particularly when half to three-quarters grown.

MUSEUM DIAGNOSIS. See Baker, loc. cit.; Van Tyne & Berger 1959: 402; Stresemann 1927-34, Aves (morphology).

MOULT. Like most Anseriformes and some other groups, the Darter moults all its wing quills simultaneously after breeding and is flightless for some weeks till these have been replaced by new feathers.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	331-357	74-90	42-47	202-240 mm. (Baker)

COLOURS OF BARE PARTS. Iris, inner ring white, outer yellow. Bill dark horny brown; terminal half black, lower mandible yellowish. Legs and feet black.

MISCELLANEOUS. Darters are regularly employed by local wandering tribes in parts of Assam and Bengal for catching fish in swamps and small

lakes (Stonor, JBNHS 47: 746). The practice is not widespread and fast dying out.

Family FREGATIDAE: Frigate Birds or Man-of-war Hawks

Rather large, gregarious, dark coloured or black-and-white oceanic birds with long, pointed, streamlined wings, deeply forked tails, and flight resembling that of raptors. Bill long and strongly hooked, rounded in cross-section, the culmen convex. Nostrils obsolete. Throat bare; bright coloured gular pouch occasionally inflated like a balloon to ridiculous proportions by courting male, even in flight. Tarsus very short, stout, feathered. Feet small, all four toes united by a web near their base; claws long, strong, much curved; middle claw pectinate as in tropic-birds and cormorants.

Sexes dimorphic; female larger than male. For anatomical details see Baker 1929, 6: 295; Palmer 1962, 1: 365-6.

RANGE. Pan-tropical. Oceanic islands and adjacent seas. Non-migratory.

GENERAL HABITS and FOOD. Chiefly fish and squids (cephalopods) neatly picked up from surface shoals with an inward flick of the strongly hooked bill while hovering close above the water. Sometimes flying fish chased and captured in the air. More usually food procured by pirating — attacking and chasing boobies, tropic-birds, etc. and forcing them to give up what they have caught. The booty is swooped off in mid-air before it reaches the water, or scooped up from the surface as it falls. They also swoop and carry off the young of colonial-nesting birds such as terns.

Frigate birds are magnificent fliers and capable of soaring and sailing for hours at a stretch high up in the heavens. Owing to their short legs and long wings they cannot take off from a flat surface, therefore they hardly ever alight on a calm sea, spending almost all day on the wing. They roost at night on trees and bushes, and also build their stick nests in similar situations, and on rocks. Eggs, usually 1 (or 2), chalky white. Incubated by both sexes. Incubation period about 6 weeks. Chick blind and naked at hatching; covered with white down later.

Key to the Indian forms

	Page
A Upperparts uniformly dark except for white band across hindneck . . 1	
B Upperparts uniformly dark, no white band across hind neck 2	
C Head, neck, and underparts white or rusty white, rest of upperparts dark. Brown or rusty markings of neck sometimes becoming darker and forming broad band across chest. Juvenal plumage of all three species	
1 Throat black, breast and abdomen white. <i>F. andrewsi</i> (female)	47
Throat black, breast white, abdomen black. <i>F. ariel iredalei</i> (female)	49
2 Underparts uniformly dark. <i>F. minor aldabrensis</i> (male)	47
Underparts not uniformly black. a	
a Throat, breast, and abdomen black, flanks white. <i>F. ariel iredalei</i> (male)	49
Throat whitish, breast white, abdomen black. <i>F. minor aldabrensis</i> (female)	47
Throat black, breast black, abdomen white. <i>F. andrewsi</i> (male)	47

Genus *FREGATA* Lacépède

Fregata Lacépède, 1799, Tabl. Ois. : 15. Type, by subsequent designation,
Pelecanus aquilus Linnaeus

Characters as of the Family.

30. **Christmas Island Frigate Bird.** *Fregata andrewsi* Mathews

Fregata andrewsi Mathews, 1914, Austr. Av. Rec., 2: 120

(Christmas Island, Indian Ocean)

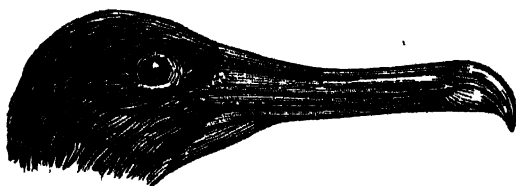
Baker, FBI No. 2191, Vol. 6: 295

SIZE. Kite +; length ♂ c. 97 cm. (38 in.); ♀ c. 102 cm. (40 in.).

FIELD CHARACTERS.

Male (adult, breeding). *Above*, glossy metallic black. *Below*, throat and breast black, only the belly white.

Female (adult). Larger than male. *Above*, same as ♂. *Below*, only throat black, rest of underparts white, the white spreading up as a collar on sides of neck (to clavicular region), not across hindneck.



× c. ½

STATUS, DISTRIBUTION and HABITAT. Vagrant; possibly storm-driven. Breeds on Christmas Island (Indian Ocean) south of Java, c. 11°S. The record from Kerala (Prater, JBNHS 33: 446, and *Synopsis*: 11) proves on a re-examination of the specimen to relate not to this species but to *Fregata minor* (Abdulali, JBNHS 57: 667-8). Similarly the only Ceylon specimen in the Colombo Museum, hitherto recorded as *F. andrewsi*, has been shown to be *F. minor aldabrensis* (Phillips 1953). Therefore it must be emphasized that so far no authentic record of *Fregata andrewsi* in Indian waters exists.

MUSEUM DIAGNOSIS

MEASUREMENTS

Wing ♂ 600-625; ♀ 635-643 mm. (Baker). Average of wing of 10 mature specimens ♂ 610; ♀ 650 mm. (Gibson-Hill 1947).

(For an excellent and complete biography of this species see C. A. Gibson-Hill 1947.)

31. **Lesser Frigate Bird.** *Fregata minor aldabrensis* Mathews

Fregata minor aldabrensis Mathews, 1914, Austr. Av. Rec., 2: 199 (Aldabra Island)

Baker, FBI No. 2192, Vol. 6: 297

OTHER NAME. Great Frigate Bird (!).

SIZE. Kite +; length *c.* 87–102 cm. (34–40 in.).

FIELD CHARACTERS.

Male (adult). *Above*, glossy black with a brown band on wings across the median wing-coverts and innermost secondaries. *Below*, brownish black.

Female (adult). Larger than male. *Above*, including head and neck, black with a brown hind collar and light brown band on wings. *Below*, throat and foreneck greyish white (or mottled brown and white); lower neck, breast and sides white; flanks and abdomen black. 'The female is the only frigate bird with white underparts and whitish throat' (Alexander 1955).

STATUS, DISTRIBUTION and HABITAT. Rare straggler (storm-driven) in the monsoon. Breeds on Seychelles and Aldabra Islands (Indian Ocean) lying between the equator and 15°S., and 45° to 60°E.

The only Indian specimen (♂, BNHS Coll.) is a storm-blown example, entangled in a fishing net in a rough sea at the onset of the SW. monsoon near Quilon (Kerala), originally misidentified as *F. andrewsi* (q.v.). But there are three independent SW. monsoon sight records from Bombay by reliable observers (Taylor, JBNHS 51: 939) and two specimens from Ceylon, both females — one in the Colombo Museum (also recorded as *F. andrewsi* but since corrected), the other from the Tweeddale Collection in the British Museum. Phillips's sight record (JBNHS 55: 203) of large all-black frigate birds in the Maldiv Islands in December and January presumably also relates to this form.

HABITS, FOOD, etc. See under Family.

MUSEUM DIAGNOSIS

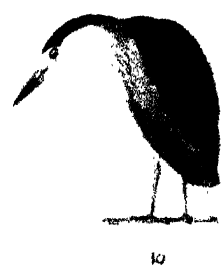
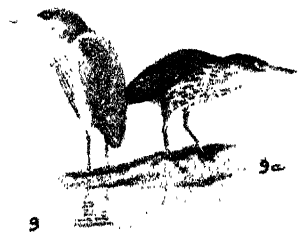
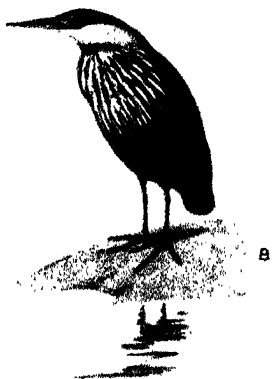
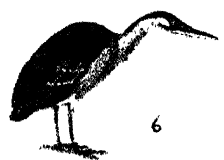
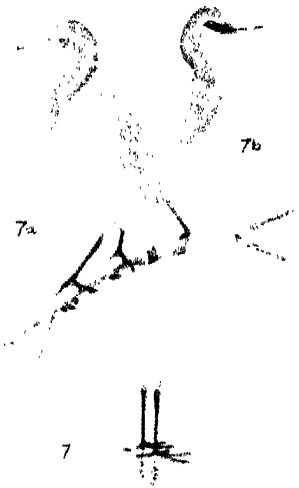
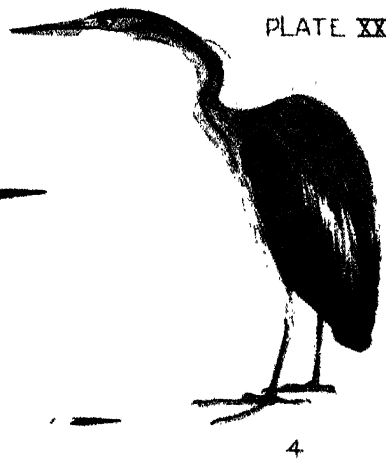
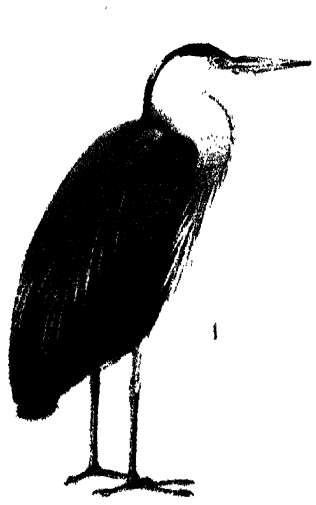
MEASUREMENTS

	Wing	Bill (from feathers)	Middle toe	Tail
♂♂	585–603	116–130	48–57	392–410 mm.
♀♀	605–621	130–150		395–430 mm. (Baker)

COLOURS OF BARE PARTS (in nominate *minor* of Christmas Is. etc.) Iris (♂♀) dark brown; a white spot on lower lid. Eyelids: ♂ black; ♀ crimson or madder pink. Bill (♂♀) variable slaty, steel, or blue grey, often darker or brownish at tip; usually a pinkish area at base of lower mandible in ♀. Interramal and throat skin: ♂ pale scarlet, ♀ dull crimson. Gular pouch in ♂ light scarlet (non-breeding) to crimson-scarlet (breeding). Feet: ♂ dark, or reddish brown with pale pinkish white soles; ♀ flesh white (Gibson-Hill 1947).

PLATE 3

1 *Ardea c. rectirostris*, Grey Heron (36). 2 *Egretta a. modesta*, Large Egret (46), breeding. 3 *Egretta g. garzetta*, Little Egret (49), breeding. 4 *Ardea p. manilensis*, Purple Heron (37). 5 *Ardeola g. grayii*, Indian Pond Heron (42). 6 *Butorides striatus (connectens)*, Little Green Heron (38 RE). 7 *Bubulcus i. coromandus*, Cattle Egret (44), winter; 7a & 7b breeding. 8 *Dupetor f. flavirostris*, Black Bittern (58). 9 *Ixobrychus cinnamomeus*, Chestnut Bittern (56), ♂; 9a ♀. 10 *Nycticorax n. nycticorax*, Night Heron (52).



Authentic
1940

32. **Least Frigate Bird.** *Fregata ariel iredalei* Mathews

Fregata ariel iredalei Mathews, 1914, Austr. Av. Rec., 2: 121 (Aldabra Island)
Baker, FBI No. 2193, Vol. 6: 298

OTHER NAME. Mascarene Frigate Bird.

SIZE. Kite +; length c. 80 cm. (32 in.).

FIELD CHARACTERS. The smallest frigate bird. 'Adults are distinguished from all other species by the conspicuous white patch on the side under the wing' (Alexander 1955).

Male (adult). *Above*, glossy metallic black. *Below*, browner with a white patch on each side of abdomen (lower flank).

Female (adult). Larger than male. *Above*, mainly glossy black with a chestnut collar on hindneck and a brownish patch on the wing-coverts. *Below*, throat and abdomen black; breast buffy white.

STATUS, DISTRIBUTION and HABITAT. Occasional straggler, doubtless often storm-blown in the monsoon. Breeds on Aldabra Island, near Madagascar, 9°30'S., 46°30'E. Reportedly also on the more northerly atolls in the Maldives c. 4°N., 72°E. (Phillips & Sims, JBNHS 55: 203, 1958). Apart from sight records there are at least six examples taken on the west coast of Ceylon, in June, July, August, September, and one near Jaffna, Northern Province, in April. An exhausted storm-driven male on 23 June (1955) near Colombo was in fresh plumage with 'testes enlarged' (Phillips 1953, 1956).

Only two records from India: a young bird taken near Trivandrum (Kerala) in c. 1904 (Ferguson, JBNHS 16: 13) — specimen not now available for re-examination — and 1 (♂) at Bombay in July 1960 (Abdulali, JBNHS 57: 668).

GENERAL HABITS, FOOD, etc. See under Family.

MUSEUM DIAGNOSIS

MEASUREMENTS. Gibson-Hill (1950) gives for adults from Cocos-Keeling Is. (subspecies?) as follows:

	Wing	Bill	Tarsus	Tail
4♂♂	518-550 (533.5)	79-85 (82.2)	22-23.5 (22.75)	307-331 mm. (316.5)
5♀♀	534-562 (547.0)	86-93 (89.4)	24-25.5 (24.9)	314-324 mm. (318.4)

A ♂ from Ceylon measures: Wing 520; bill 81; tarsus 21; tail 304 mm. (Phillips 1958).

The Bombay specimen (♂) measures Wing 520; bill (from skull) 82; tail 325 mm. (SA).

COLOURS OF BARE PARTS. ♂ Bill grey, gular pouch red; feet black or reddish brown. ♀ Bill bluish; skin of throat red; feet red (Alexander, 1955).

Order CICONIIFORMES**Family ARDEIDAE: Herons, Egrets, Bitterns**

Long-legged, lanky wading birds, from body size of village hen to vulture, with long slender flexible necks in most species. A kink in the middle (as in the Darter) enables the neck to be retracted into a flat S in flight as is characteristic of the family.

Bill long, straight, sharp-pointed, dagger-like. Nostrils oval, close to the base. Tarsi very long; toes long and slender, the middle and outer toes united by a small web at their base. Claw of middle toe pectinate or comb-like. Hind-toe well developed; on same plane as the other toes.



Middle toe and claw of adult

Grey Heron showing pectinations, $\times c. 1$

Most species have curious powder-down patches on each side of rump and breast providing a sort of dry shampoo for degreasing soiled feathers. Plumage soft and loose-textured, usually white, grey, purple, or brown; in some species speckled, barred, or streaked above and/or below. Sexes alike or nearly so. In many species filamentous ornamental plumes acquired during the breeding season, for the trade in which (as 'aigrettes') the birds were greatly persecuted and in some places nearly exterminated (see Little Egret).

DISTRIBUTION and HABITAT. Throughout the tropical and temperate zones, except on some oceanic islands. Marshes, jheels, rivers, tidal estuaries.

FOOD. Fish, frogs, insects, molluscs, rodents, young birds.

BREEDING. Colonial; usually in mixed heronries of several species in association. *Nests*, shallow stick platforms normally on trees. *Eggs*, normally 3 to 6, bluish white or pale greenish blue; unmarked in Indian species. *Young*, nidicolous.

CLASSIFICATION. Ripley 1961: 11-19.

ANATOMICAL DETAILS. Witherby 1939, 3: 125. Stresemann 1927-1934, Aves: 810.

Key to the Indian forms

Page

- | | | | |
|---|--|--|--------|
| A | Large-sized. Plumage grey above, varied below..... | 1 | |
| 1 | Crown and crest vinous-chestnut, neck rufous-cinnamon (length 142-152 cm. = 56-60 in.)..... | <i>Ardea goliath</i> (adult) | 53 |
| | Crown and neck dull rufous, foreneck streaked with black (slightly smaller than above)..... | <i>Ardea goliath</i> (juvenal) | 53 |
| | Crown black, crest grey-tipped (127 cm. = 50 in.)..... | | |
| | | <i>Ardea insignis</i> (adult) | 53 |
| | Crown white, occipital crest black, neck smoky white (98 cm. = 39 in.)..... | <i>Ardea cinerea</i> (adult) | 54, 55 |
| | Crown grey, crest black, neck grey (slightly smaller than above).... | | |
| | | <i>Ardea cinerea</i> (juvenal) | 54, 55 |
| | Crown black, neck ferruginous striped with black and buff (97 cm. = 38 in.)..... | <i>Ardea purpurea</i> (adult) | 57 |
| B | Large-sized. Plumage dark brown to cinnamon brown above, head and neck rufous..... | 2 | |
| 2 | Dark brown above, head and neck pale rufous-brown streaked with white (127 cm. = 50 in.)..... | <i>Ardea insignis</i> (juvenal) | 53 |
| | Head and neck rufous-brown. Lower foreneck streaked with black, rest of plumage uniform cinnamon-brown in distance as result of broad cinnamon-brown edges masking the purplish slaty feathers (97 cm. = 38 in.) | <i>Ardea purpurea</i> (juvenal) | 57 |
| C | Medium-sized. Plumage mainly dark slaty blue above and below...3 | | |
| 3 | Throat and breast streaked with chestnut and white (58 cm. = 23 in.)..... | <i>Dupetor flavicollis</i> (adult) | 88 |
| | Throat glistening white, bushy nuchal crest (58 cm. = 23 in.).... | | |
| | | <i>Egretta sacra</i> (breeding — dark phase) | 77 |

HERONS, EGRETS

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Page

- Throat glistening white, crest of two long feathers (63 cm. = 25 in.)
 *Egretta gularis* (breeding — dark phase) 74
- D Small- to medium-sized. Plumage mainly various shades of greenish- or bluish-black, white, and grey. 4
- 4 Plumage generally white and grey, with greenish black crest and mantle, wings paler than back (58 cm. = 23 in.)
 *Nycticorax nycticorax* (adult) 78
- Smaller (46 cm. = 18 in.). Plumage generally grey with greenish-black crest, mantle streaked with pale greenish grey, wings darker than back *Butorides striatus* (adult) 59-62
- E Wings and upperparts dark sooty brown glossed with metallic green, wing-coverts spotted with white, sides of neck and underparts streaked with slaty brown. 5
- 5 Crown and crest brown (58 cm. = 23 in.)
 *Nycticorax nycticorax* (juvenal) 78
- Crown and crest black (46 cm. = 18 in.)
 *Butorides striatus* (juvenal) 59-62
- F Small- to medium-sized. Wings, tail, and underparts white; head, neck, breast, and back variable. 6
- 6 Head, neck, and breast pale ochre. Back dark rusty or maroon-brown (46 cm. = 18 in.) *Ardeola grayii* (breeding) 63, 65
- Head dark rusty brown, breast purplish, back deep blue-black (52 cm. = 21 in.) *Ardeola bacchus* (breeding) 65
- Head, neck, and breast pale ochre heavily streaked with dark brown, back pale ashy brown. *Ardeola grayii* (non-breeding) 63, 65
- Similar to above but back darker. *Ardeola bacchus* (non-breeding) 65
- G Medium-sized. Plumage generally light buff or rich chestnut. 7
- 7 Top of head black, sides of head, neck, and upperparts rich chestnut-brown, back finely vermiculated with black, underparts pale buffy white streaked with black and chestnut. Under wing-coverts white barred with black, primaries black tipped with chestnut and white. Bill short and stout (51 cm. = 20 in.) *Gorsachius melanolophus* 80, 82
- Top of head and moustache black, rest of plumage pale yellowish buff, upperparts heavily streaked with blackish, underparts streaked with chestnut, primaries black barred with pinkish brown (71 cm. = 28 in.) *Botaurus stellaris* 89
- H Generally small-sized with underparts predominantly brown, buff, or chestnut 8
- 8 Colour and pattern of upperparts sharply differentiated on crown, back of neck, and mantle a
- Colour and pattern of upperparts less sharply differentiated on crown, back of neck, and mantle. b
- Colour of upperparts with no sharp differentiation of crown, back of neck, or mantle. c
- a Top of head, upperparts and primaries black; large greyish buff patch on wing; underparts pale buff with dark lanceolate feathers across upper breast (36 cm. = 14 in.) *Ixobrychus minutus* (male) 83
- b Crown black, back of neck pale chestnut, mantle dark brown (in value, almost as dark as primaries). Buffy patch on wing (36 cm.

= 14 in.)	<i>Ixobrychus minutus</i> (female)	83
Crown blackish, back of neck pale buff, feathers of mantle dark brown broadly edged with pale buff, buffy patch on wing		
	<i>Ixobrychus minutus</i> (juvenal)	83
Crown streaked with black and chestnut, back of neck chestnut, mantle chestnut streaked with darker brown and buff, no buffy patch on wing, chestnut streak down throat pronounced (38 cm. = 15 in.)	<i>Ixobrychus sinensis</i> (juvenal)	86
Similar to above but crown darker, back of neck chestnut, mantle brown streaked with buff, wing patch buffy, streak down throat not pronounced	<i>Ixobrychus sinensis</i> (female)	86
Crown, primaries, and tail black, back of neck rufous, mantle brownish buff, wing patch buffy, underparts pale buff with dark lanceolate feathers across breast	<i>Ixobrychus sinensis</i> (male)	86
c Upperparts dark brown, underparts paler and unstreaked, middle of throat chestnut streaked with black and white, tail black (58 cm. = 23 in.)	<i>Dupetor flavicollis</i> (female)	88
Upperparts dark brown speckled with yellowish buff, underparts yellowish white with blackish streaks on throat and breast, tail brown (38 cm. = 15 in.)	<i>Ixobrychus cinnamomeus</i> (juvenal)	84
Similar to above but paler and more chestnut	<i>Ixobrychus cinnamomeus</i> (female)	84
Upperparts bright chestnut, underparts paler, median streak of blackish on throat and breast	<i>Ixobrychus cinnamomeus</i> (male)	84
I Plumage pure white throughout		9
9 Neither crest nor breast plumes, but lacy plumes on back	<i>Egretta alba</i> (breeding)	68, 69
No crest but full plumes on back and breast	<i>Egretta intermedia</i> (breeding)	71
Crest of two long feathers; full plumes on back and breast; feet particoloured; bill black	<i>Egretta garzetta</i> (breeding)	72
Crest of two long feathers; full plumes on back and breast; feet particoloured; bill yellow	<i>Egretta gularis</i> (breeding — light phase)	74
Crest of thick, rather hairy feathers	<i>Egretta sacra</i> (breeding — light phase)	77
Feathers of head and neck orange-buff	<i>Bubulcus ibis</i> (breeding)	66

Genus ARDEA Linnaeus

Ardea Linnaeus, 1758, Syst. Nat., ed. 10, 1: 141. Type, by subsequent designation, *Ardea cinerea* Linnaeus (Gray, 1840)

Bill long, compressed, and pointed; culmen straight, edges of both mandibles slightly serrated at commissure. Upper mandible grooved on either side; nostrils rather long, situated near base. Sides of head to behind eye naked. Tibia partially naked; tarsus long, scutellated in front. Wings ample and rounded; tail short, nearly square-cut. Head crested; lower plumage very lax and soft; feathers at base of neck below and on scapulars long and attenuated forming ornamental plumes.

Genus cosmopolitan.

33. **Great Whitebellied Heron.** *Ardea insignis* Hume*Ardea insignis* Hume, 1870, *Stray Feathers*, 6: 470 (Sikkim Terai, Bhutan Duars)

Baker, FBI No. 2220, Vol. 6: 342

Plate 5, fig. 2, facing p. 96

LOCAL NAMES. None recorded.

SIZE. Considerably larger than Grey Heron; length *c.* 127 cm. (50 in.).

FIELD CHARACTERS

Adult. *Above*, like the Grey Heron (q.v.). Crown slaty black (*contra* white), the longest crest feathers tipped grey. Tail and primaries slaty black. *Below*, lower breast, abdomen, flanks, axillaries, under tail-coverts pure white. Thigh-coverts white in front, grey behind. Sexes alike.

'Except for the whitish chin and throat, and the shiny white belly, under wing- and under tail-coverts, the bird appears dull grey all over' (H. C. Smith, MS.).

STATUS, DISTRIBUTION and HABITAT. Resident, but apparently rare, in Nepal and Sikkim terai, Bihar (north of Ganges river), Bhutan duars to NE. Assam. East Pakistan, Arakan, and N. Burma where the upper reaches of the Irrawaddy river mentioned as one of its strongholds. Affects inland swamps, marshes, and stretches of rivers through forest. Not on sea coast. Singly or in small parties of four or five.

GENERAL HABITS. As of the Family. Nothing specifically recorded.

BREEDING. Unrecorded in our area; only once in Arakan, Burma (April) — a huge stick nest in a lofty tree, containing four eggs like those of Grey Heron but larger, *c.* 70 × 50 mm.

MUSEUM DIAGNOSIS. See A. O. Hume 1878, *Stray Feathers*, 6: 470-1.

MEASUREMENTS. A male collected by H. C. Smith in Burma had wing 530 mm. Baker gives for

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	546-572	152-176	171-216	199-211 mm.

COLOURS OF BARE PARTS. 'Iris ochraceous yellow. Bill and legs blackish' (H. C. Smith).

'Loral skin, orbital skin, and base of lower mandible greenish; upper mandible and inner margin of lower mandible blackish slaty; tip of lower mandible underneath greenish ochre, remaining portion mussel-grey. Tarsus black with horny patches. Claws black' (Stevens).

34. **Giant Heron.** *Ardea goliath* Cretzschmar*Ardea goliath* Cretzschmar, 1826, in Rüppell's Atlas, Vögel : 39, pl. 26

(White Nile, Bahhar Abiad)

Baker, FBI No. 2221, Vol. 6: 343

Plate 5, fig. 5, facing p. 96

LOCAL NAMES. None recorded.

SIZE. Considerably larger than Grey Heron; length *c.* 142-152 cm. (56-60 in.). Standing almost the height of a man.

FIELD CHARACTERS. Like a gigantic Purple Heron.

Adult. *Above*, crown and crest deep vinous chestnut; neck rufous-cinnamon. Upperparts, wings and tail slaty grey. *Below*, chin, cheeks, and throat, white; elongate breast plumes streaked white and slaty black. Lower parts, including wing-lining, deep chestnut or maroon. Sexes alike.

Young (immature). *Above*, head and neck duller and paler rufous. Upperparts grey with rufous edging. *Below*, white streaked with brown.

STATUS, DISTRIBUTION and HABITAT. Rare vagrant. Essentially an African species, breeding on islands off the African and Arabian coasts of the Red Sea, and in Iraq, etc. Appearances in India sporadic, rare, and somewhat mysterious. Blyth got some live examples in the Calcutta market in 1845 and 1846, presumably from the Salt Lakes where he shot one bird each in 1878 and 1879; a third seen in 1880. In c. 1873 Hume saw six gigantic herons on the river near Multan (W. Pakistan) above the confluence of the Chenab and Sutlej, with a great deal of rufous about the neck, which were probably this species (SF, 1: 105). Blanford observed one example each near Nagpur (Madhya Pradesh) and in Baluchistan; Stuart Baker saw five on the Meghna river near Dacca in 1910. After that no record till December 1925 when one was shot by L. R. Fawcus in the Khulna Sunderbans, now in East Pakistan (JBNHS 31: 523). Though described by the collector as 'not uncommon', there are no further reports since. Two specimens collected in Ceylon, also in 1878 and 1879, and another seen on the latter occasion, but not again since!

GENERAL HABITS. As of the Family. In its endemic area frequents tidal creeks, mangrove swamps, estuaries, and inland lakes. Usually solitary and very shy. Has a seemingly slow and ponderous flight. Archer 1937 (1: 47) points out that for the bird's size its pale blue eggs are remarkably small (c. 71×52 mm.), being nearly equal to those of the Crab Plover (*Dromas ardeola*), which is one-third its size, or less, but lays large eggs.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	570-589	184-196	225-252	212-237 mm.
♀♀	592-662	180-196		

COLOURS OF BARE PARTS. Iris yellow, with an outer rim of red. Bill dark horny-slate, the lower mandible, gape, and commissure paler and yellowish. Legs and feet dark slaty black (Baker).

35. European Grey Heron. *Ardea cinerea cinerea* Linnaeus

Ardea cinerea Linnaeus, 1758, Syst. Nat., ed. 10, 1: 143 (Europe, restricted to Sweden)
Baker, FBI No. 2217, Vol. 6: 339

LOCAL NAMES. As under No. 36.

SIZE. Length c. 98 cm. (39 in.) including neck and legs. Standing about 75 cm. high.

FIELD CHARACTERS. A lanky, long-legged, long-necked grey marsh bird. Indistinguishable in the field with certainty from the resident Eastern

Grey Heron (q.v.), from which it differs in being a darker grey above. Sexes alike; female smaller.

STATUS, DISTRIBUTION and HABITAT. Casual winter visitor, recorded from Baluchistan, Sind, Kutch, and Nepal (Rand & Fleming), but possibly commoner and more widespread than hitherto believed. Shows great diversity of status within a single population, some individuals (or local populations) sedentary, others — specially juveniles — tending to wander and even migrate long distances. Thus, a ringed example from Kazakhstan (40°48'N., c. 70°E.) USSR was recently recovered in South Kanara, Mysore (JBNHS 59: 650). Breeds in the Palaearctic and Ethiopian regions — Europe, N. Africa to Asia Minor, NW. Siberia.

MUSEUM DIAGNOSIS. See Witherby 1939, 3: 131–3.

MEASUREMENTS, COLOURS OF BARE PARTS, etc. See under No. 36 below.

36. **Eastern Grey Heron.** *Ardea cinerea rectirostris* Gould

Ardea rectirostris Gould, 1843, Proc. Zool. Soc. London : 22 (New South Wales ' = India? ', Stone, 1913, Austral. Av. Rec., 1: 142 restricted by Ripley 1961, Synopsis: 12 to India)

Ardea leucophaea Gould, 1848, Proc. Zool. Soc. London : 58 (India)

Ardea cinerea jouyi Clark, 1907, Proc. U.S. Nat. Mus., 32: 468 (Seoul, Korea) Baker, FBI No. 2218, Vol. 6: 340

Plate 3, fig. 1, facing p. 48

LOCAL NAMES. *Nāri*, *Sain*, *Kābūd*, *Ānjān* (Hindi); *Khyra* (Bihar); *Sada kānk* or *Kānk*, *Anjan* (Bengal); *Saa* (Sind); *Brāg* (Kashmir); *Narayana pachchi* (Telugu); *Nārāi* (Tamil); *Chārāmūnti* (Malayalam); *Kalapua karawal koka*, *Indura koka* (Sinhala); *Kūdāl* (Kolīs of Maharashtra).

SIZE. Same as No. 35. Standing c. 75 cm. high.

FIELD CHARACTERS. A long-legged, long-necked marsh bird.

Male (adult). *Above*, ashy grey with white crown and neck, and long black occipital crest. *Below*, a conspicuous black-dotted line down middle of foreneck. Elongated black-streaked white feathers on breast. Rest of underparts greyish white.

Female similar but smaller, with the crest and pectoral plumes less developed.

STATUS, DISTRIBUTION and HABITAT. Resident. All India, both Pakistans, Nepal, Ceylon, Maldives Islands, Andamans, and Nicobars (?). From plains level to about 900 m. in Nepal, and between c. 3500–4000 m. in Ladakh. Breeds up to c. 1750 m. — Vale of Kashmir. Affects inland water — jheels, marshes, rivers; also tidal creeks, estuaries, mangrove swamps, coastal backwaters, and rocky offshore islets.

Extralimital. The Middle East, Burma, Thailand, Indochina, Malaysia, E. Siberia, E. China, Japan, Formosa, Hainan.

GENERAL HABITS. Usually solitary, occasionally small parties; gregarious when nesting. Largely crepuscular, hunting chiefly in the early morning twilight and into the dusk. Still-hunts by standing motionless at the water's edge head sunk between the shoulders, or wades into the shallows neck arched and partly stretched forward, peering intently for any fish or frog

that may blunder within striking range of the formidable poised bill. When prey is sighted the bird cranes its flexible neck forward and freezes, waiting for a favourable opportunity to strike. Presently the rapier bill is shot out with lightning speed and the unsuspecting victim impaled or firmly secured in the mandibles. With an upward jerk it is manoeuvred into position and swallowed head foremost. Sometimes the bird will stalk its prey stealthily or shift to a new vantage point, lifting up and putting down each foot noiselessly and with studied deliberation. Single birds observed perched all day long on snags—the remnants of submerged forest trees under the waterspread of dammed irrigation reservoirs (e.g. Periyar Lake in Kerala), almost flush with the surface. They procure their food in such deep water by jabbing at prey as it swims or floats past or by short forays from the base, bellyflopping momentarily on the surface to seize a fish. When disturbed, the bird rises with a harsh *quaarnk* which is also uttered from time to time on the wing. The initial take-off from the perch is clumsy and accompanied by an awkward stretching of the long neck, vigorous laboured flapping of the wings, and by much swaying and balancing with the long loosely dangling legs. The launching is preceded by a slow swinging, or wagging, of the tail up and down, as if to assist in the process. The bird then flexes its legs and springs upward. Once in the air it flies strongly with steady flaps of the broad wings, neck characteristically folded back in a flat S, head drawn in between the shoulders, legs tucked under the tail and trailing behind. It roosts at night on trees and mangroves, and also settles on them in daytime when sated.

FOOD. Fish, frogs, molluscs, crustaceans, aquatic insects, small rodents, and young birds. In Kashmir alleged to do considerable damage to the trout fisheries. However, a proper scientific investigation of the food and feeding habits may reveal, as elsewhere, that by preying largely on predatory fishes the birds actually do more good than harm to the trout. Drinks water in the usual manner of birds, repeatedly dipping bill into the liquid and raising head to swallow.

VOICE and CALLS. In addition to the resonant *quaarnk* uttered in flight, a variety of harsh croaks and, at the heronry, a goose-like *honk*.

BREEDING. *Season.* Various. Mainly March to June in Kashmir; July to October in northern India; November to March in S. India and Ceylon. Nests gregariously, sometimes in pure colonies but usually in mixed heronries of egrets, storks, cormorants, night herons, etc. Two best-known of such heronries are Keoladeo Ghana in Rajasthan, and Vedanthangal in Madras, but smaller and less-known ones widely scattered over the country. In Kashmir Valley the largest chenar trees (*Platanus orientalis*), often over 35 m., are selected for the nests; in Keoladeo Ghana large *kēli-kādāmb* (*Stephegyne parviflora*), and babool (*Acacia arabica*) and kandi (*Prosopis spicigera*) are the most favoured, while at Vedanthangal the substrate is provided by partially submerged *Barringtonia racemosa* trees. The selected trees are usually standing in water or in its close proximity. In tidal forest nests are normally built on mangroves, *Avicennia*, *Rhizophora*, and other species. Rarely tall dense reed-beds are used. *Nest*, a platform of twigs with a central depression scantily lined with leaves, straw, and water-weeds. Often many nests in a single tree, cheek by jowl with those of other tenants of the heronry. *Eggs*,

normally 3 or 4 occasionally 5, broad to moderately long ovals, pale sea green or green-blue, variable in shade. Average size of 100 eggs 58.6×43.5 mm. (Baker).

Both sexes share in building the nest, incubation, and feeding the young. Incubation period 25–26 days. Incubation, as with most other occupants of heronries, begins with the first egg as a protection from the fierce sun and from nest-robbers like crows. Thus a marked disparity is noticeable among chicks of the same brood. Chick in down grey above whitish below; the down on the crown very long and erect with bristly tips giving a crested appearance. Young fed by regurgitation. On arrival of parent at nest its bill is seized by an importunate youngster in its own mandibles and vigorously twisted and wrestled with till the parent disgorges the half digested food. This either taken by small chicks directly from parent's bill or gobbled up from nest floor when older.

For details of courtship, nest relief and other behaviour see Witherby 1939, 3: 126–9.

MUSEUM DIAGNOSIS. For plumages of nominate race, from which *rectirostris* differs only in minor details, see *ibid.*: 131–3.

MEASUREMENTS. Baker gives for Indian and Chinese examples of *rectirostris*:

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	422–475 (once 481)	109–135	140–162	165–180 mm.

There is no significant difference in size between the two races.

COLOURS OF BARE PARTS. Iris golden yellow. Bill (breeding) bright orange-yellow with a brown line down middle of culmen; (non-breeding) dark horny brown. Legs and feet (breeding) bright orange-yellow sometimes with a pink tinge; (non-breeding) greenish brown, marked with yellowish on the joints and back of tarsi (SA).

MISCELLANEOUS. Longevity, *A. c. cinerea* (from ringing data) = 24 + years (Ring, 1962, 33: 148).

37. Eastern Purple Heron. *Ardea purpurea manilensis* Meyen

Ardea purpurea var. *manilensis* Meyen, 1834, Nova Acta Acad. Caes. Leop. Carol. 16, suppl.: 102–103 (Philippines)

Baker, FBI No. 2216, Vol. 6: 337

Plate 3, fig. 4, facing p. 48

LOCAL NAMES. *Nāri*, *Lāl sain*, *Lāl ānjān* (Hindi); *Khyra* (Bihar); *Lāl kāñk* (Bengal); *Lāl kol* (Assam); *Yerra nārīyānā pākshi* (Telugu); *Chēnnārai* (Tamil); *Chāyāmūnti* (Malayalam); *Karawala kokka*, *Barendi kokka* (Sinhala).

SIZE. Smaller and slighter than Grey Heron; length *c.* 97 cm. (38 in.) including long neck and legs. Standing *c.* 70 cm. high.

FIELD CHARACTERS. A lanky marsh bird like the last. In direct sunlight upperparts, including dorsal surface of wings, bright purple, a shade darker than the Purple Moorhen.

Adult. *Above*, purplish blue or purplish slaty; blackish on wing and tail. Crown and crest slaty black, rest of head and long thin neck ferruginous boldly striped with black. *Below*, chin and throat white; long drooping plumes on upper breast buffy white with black and chestnut streaks. Rest of

underparts slaty black and rich chestnut; under wing chiefly ferruginous. Sexes alike; female with crest and pectoral plumes less developed.

Young (immature). Uniform cinnamon brown in distance, effect of broad cinnamon-brown edges masking the purplish slaty feathers.

STATUS, DISTRIBUTION and HABITAT. Resident and local migrant. Throughout the plains of India east to Assam and Manipur, both Pakistans, Nepal (lowlands), Ceylon and Andaman Islands. Possibly, as in Grey Heron, augmented in winter by influx of extralimital migrants. The nominate race, with more black streaks on foreneck, has been obtained by Meinertzhagen (JBNHS 32:91) in Baluchistan (Quetta, Nushki), where it occurs sporadically (Christison, *ibid.* 43:486). Frequents jheels, reedy swamps, lakes, and rivers.

Extralimital. Burma, Thailand, the Indochinese countries, China south of the Yangtze and Ryukyu Islands, south to the Philippines, Greater Sunda Island and Celebes (Sulawesi). Other races in Europe, Madagascar, and Ussuriland.

GENERAL HABITS. Largely crepuscular. Solitary. Similar to those of Eastern Grey Heron (q.v.). Perhaps shyer and more secretive, keeping to dense reed cover, where it may be easily overlooked on account of the bittern-like way it freezes on suspicion — thin neck and bill upstretched — camouflaging it among the reeds. The bird flushes out with a flutter and harsh croaking when suddenly come upon, and settles on a low tree in the open until the covert is quiet again.

FOOD and VOICE. Similar to the Grey Heron.

BREEDING. *Season.* Various; June to September-October in N. India; November to March in S. India and Ceylon. Usually nests in small colonies of its own. When in mixed heronies with other species, shows a tendency to segregation into its own *mohallas*. *Nest*, a platform of sticks and branches, or rush stems, built in trees, dense reed beds, or screw pine (*Pandanus*) tangles standing in fairly deep water, from a few centimetres to two or three metres above the surface. The rushes or *Pandanus* leaves are beaten down to form a platform for the nest. *Eggs*, 3 to 5, rarely 6, pale sea green or greenish blue. Broad to moderately long ovals, close and smooth textured; very similar to eggs of Grey Heron. Average size of 100 eggs 54.6×39.7 mm. (Baker). Both sexes share nest-building, incubation, and care of the young. Incubation period about 24–26 days. Eggs laid at longer intervals than 24 hours; incubation commences from the first egg, hence the very marked disparity in young of the same brood. Half-grown chicks clamber about freely among branches of nest-tree, but promptly return to nest on arrival of foraging parent. The parent's bill is seized and violently stroked and drawn down to induce regurgitation. The food is gobbled up from the nest floor, or as it issues from the parent's throat.

MUSEUM DIAGNOSIS. For plumages of nominate race, from which *manilensis* differs only in details and is hardly distinguishable, see Witherby 1939, 3: 136–7.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	327–387	115–144	121–145	120–142 mm. (Baker)

Males are appreciably larger than females.

COLOURS OF BARE PARTS. Iris yellow; orbital skin dull greenish or yellowish green. Bill dark yellow, culmen and tip horny brown. Legs and feet reddish brown, soles and hinder edge of tarsus paler and more yellow. In breeding birds bill and legs much brighter orangy.

MISCELLANEOUS. Both this and Grey Heron highly prized as food by certain classes, e.g. the mohanas or inland fishermen of Sind. The birds are kept tethered by a leg, perched on floating bits of log or on the prow of the mohanas' houseboats to fatten for slaughter or use as decoys.

Longevity, *A. p. purpurea* (from ringing data): 16 + years (Ring, 1962, 33: 148).

Genus BUTORIDES Blyth

Butorides Blyth, 1852(1849), Cat. Bds. Mus. Asiat. Soc.: 281. Type, by monotypy, *Ardea javanica* Horsfield

Unlike Pond Heron (*Ardeola*) has no nuptial plumage. Tibia feathered nearly to the joint. Tarsus comparatively much shorter than in *Egretta* or *Ardeola*. Feet smaller and slenderer; middle toe with claw about equal to tarsus in length, but much shorter than bill. Head crested. Scapulars and interscapulars long and lanceolate but not disintegrated as in *Egretta* or *Ardeola*. Tail of twelve feathers as in the latter.

38. Little Green Heron. *Butorides striatus chloriceps* (Bonaparte)

Ardea chloriceps 'Hodgs.' = Bonaparte, 1857, Consp. Gen. Av., 2: 129 Nepal. (Restricted to Hitaura, Chisapani Garhi dist. by Biswas, 1959, Curr. Sci., 28: 288)

Baker, FBI No. 2231, Vol 6: 357

Plate 3, fig. 6, facing p. 48

LOCAL NAMES. *Kancha bāglā* (Hindi); *Kāna bāk* or *Kuro bāk* (Bengal); *Kona moochree* (Assam); *Dosi konga* (Telugu); *Doshi kokku* (Tamil); *Podi kokka* (Sinhala); *Chinna kokku* (Malayalam).

SIZE. Pond Heron; length c. 46 cm. (18 in.).

FIELD CHARACTERS. Smaller than Pond Heron, chiefly black, grey, and metallic dark green, but otherwise like it in general effect.

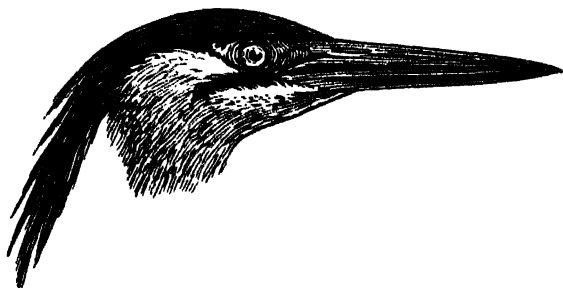
Adult. *Above*, forehead, crown, and long occipital crest glossy greenish black; cheeks white; head and neck grey. Upperparts, with lengthened scapulars, slaty grey glossed with dark green and bronze-green. Wing-coverts dark glossy green. Wing quills greer-glossed black, with grey and white tips and edges. *Below*, chin and centre of throat white. Lower parts ashy grey; under tail-coverts white with blackish tips or edges. Sexes alike.

Young (immature). *Above*, brownish without the lengthened scapulars. Crown and short crest streaked with buff. Wing feathers edged with buff, and with apical white spots. *Below*, buffy white, heavily streaked with dark brown.

STATUS, DISTRIBUTION and HABITAT. Resident. Generally, but thinly distributed throughout the subcontinent from Sind (in W. Pakistan) to eastern Assam and Manipur. Also Ceylon and Laccadive Islands. Chiefly

plains and up to least *c.* 1000 m. in the Nepal bhabar and duns, and the peninsular hills. Affects streams, lakes, ponds, etc., with dense marginal shrubby growth. Also coastal backwaters, mangrove swamps, and tidal creeks.

Extralimal. Burma, Thailand, Malaysia, Indochina, Indonesia, Philippines, Sunda Islands, Celebes (Sulawesi). Numerous other races occur in S. America, Africa, Indian Ocean islands, and eastern Asia south to Australia and S. Pacific islands.



c. $\frac{1}{2}$

GENERAL HABITS. Solitary; shy and retiring; silent. Crepuscular and nocturnal, but also active during daytime, particularly in cloudy overcast weather. Partial to shady nullahs and secluded rock pools in jungle streams bordered or overgrown with jamun (*Eugenia jambolana*) seedlings, *Phyllanthus lawii*, and similar bushes. Flushes when suddenly come upon, flying with deliberate wing flaps, the thick and heavy-looking neck stretched forward (not telescoped like heron's), and dropping into the shrubbery or alighting on an overhanging branch a hundred metres or so farther. Normally keeps during daytime to shady watercourses under the welter of tangled brushwood, uprooted trees and other debris brought down by monsoon torrents, perched rather sluggishly on some snag or projecting root a few inches above water, constantly flicking its tail up and down like a kingfisher. Very parochial; occupies the same secluded spot day after day. Here sits patiently craning down its neck now and again to jab at anything eatable that floats or swims past. Or it stealthily creeps along the water's edge and lunges at prey within range. On suspicion, surreptitiously clambers up into the seclusion of a thicket, descending immediately it is reassured.

FOOD. Fish, shrimps, frogs, crabs, water beetles, etc. Mudfish or *neota* (*Periophthalmus*) and *Belone strongylura* (16·50 - 20·25 cm. long) specifically recorded among stomach contents of specimens.

VOICE. Normally very silent. When flushed and flying off utters an alarm note *K'yow*, *K'yow* or *K'yek*, *K'yek* (y as in 'yes') (G. M. Henry). '*Tewn-tewn-tewn* like redshank' (H. Abdulali). Other notes not described.

BREEDING. Evidently double brooded. *Season*, over the greater part of the subcontinent March to September, varying locally with water conditions; in Ceylon March to July. *Nest*, a small platform of twigs with an unlined depression for the eggs. Built singly, not colonially or in mixed

heronries, though exceptionally several nests may be found in a circumscribed area. Normally 3 to 4.5 metres up in a small tree in a mangrove swamp, or in one concealed among bushes on the edge of the stream or pond; occasionally near a village, the bird's silent and secretive behaviour preventing discovery. Eggs, 3 to 5, smooth, fine textured, light sea green, very like those of Pond Heron (q.v.) but curiously enough averaging larger. Average size of 40 eggs 39.5×29.7 mm. (Baker).

Both sexes incubate and feed the young by regurgitation, the chicks seizing the adult's bill and vigorously twisting and stroking it to make it disgorge (cf. Purple Heron). Incubation period unrecorded. Courtship display and behaviour undescribed. Incubation commences with first egg, resulting in considerable disparity in growth of nestlings in the same brood.

MUSEUM DIAGNOSIS. Indian birds, *chloriceps*, are paler than those from W. Java (*javanicus*), with longer moustachial streaks and longer wings. Wing 18 ♂♂ 174-184; 6 ♀♀ 177-182 mm. v. 3 ♂♂ 165-174; 2 ♀♀ 166-174 mm. in *javanicus* (Biswas, loc. cit.).

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	174-203	56-70	47-51	54-69 mm. (Baker)

COLOURS OF BARE PARTS. Iris bright lemon-yellow. Bill, upper mandible dark horny brown, lower sage green; blacker in breeding birds. Eyelids and bare patch in front of eyes bright yellowish leaf-green. Legs and feet yellowish leaf-green, yellower on hind tarsus and soles; claws dusky.

39. Andaman Little Green Heron. *Butorides striatus spodiogaster* Sharpe

Butorides spodiogaster Sharpe, 1894, Bull. Brit. Orn. Cl., 3: xvii
(Andamans and Nicobars)

Baker, FBI No. 2232, Vol. 6: 359

LOCAL NAMES. Unrecorded.

SIZE. As last.

FIELD CHARACTERS. Similar to *chloriceps* but darker, especially on the underparts. (See Museum Diagnosis.)

STATUS, DISTRIBUTION and HABITAT. Resident. Andaman and Nicobar islands. Affects mangrove forest along the shores.

GENERAL HABITS, FOOD, VOICE, etc. As in the last.

BREEDING. No difference except that the nesting sites are chiefly in mangrove trees in tidal swamps. Eggs averaging slightly smaller — 38.2×28.2 mm. (Baker).

MUSEUM DIAGNOSIS. Differs from *chloriceps* in being darker grey, especially on neck, breast, and abdomen which are dark slaty grey. Sides of the head deeper grey with less white.

MEASUREMENTS. Slightly smaller:

	Wing	Bill	Tarsus	Tail
♂ ♀	167-171	57-60	41-44	58-62 mm.

COLOURS OF BARE PARTS. As in last.

40. Paler Maldivian Green Heron. *Butorides striatus didii* Phillips & Sims

Butorides striatus didii Phillips & Sims, 1958, Bull. Brit. Orn. Cl., 78: 51 (Malé Island, North Malé Atoll, Maldive archipelago)
Not in Baker, FBI

LOCAL NAME. *Rabonde* (Maldives).

SIZE. As *B. s. chloriceps*.

FIELD CHARACTERS. Similar to *chloriceps* but much paler even than the next form.

STATUS, DISTRIBUTION and HABITAT. Resident. Common in the central and northern atolls of the Maldive archipelago. Affects mangrove swamps and the neighbourhood of beaches.

GENERAL HABITS. Not different from *chloriceps*. At ebb tide sits on the knobs of coral on the beaches, darting out at small fishes and crabs nearby. Flies inland as tide rises to perch on tops of palm trees or stand on the sea walls and exposed coral outcrops, apparently asleep. Not shy.

41. Darker Maldivian Green Heron. *Butorides striatus albidulus* Bangs

Butorides albidulus Bangs, 1913, Proc. Biol. Soc. Washington, 26: 93 (Suadiva Atoll, Maldive Islands)
Not in Baker, FBI

LOCAL NAMES. *Rabonde* or *Rabulli* (Maldives).

SIZE. As *B. s. chloriceps*.

FIELD CHARACTERS. Similar to *chloriceps* but paler.

STATUS, DISTRIBUTION and HABITAT. Resident. Southern Maldive Islands. Mangrove swamps and around beaches.

GENERAL HABITS. As in the paler Maldivian race (q.v.).

MUSEUM DIAGNOSIS. Paler than *chloriceps*. Described from the unique type collected on Suadiva Atoll. Whether both races from within this group of islands can be maintained needs investigating.

MEASUREMENTS and COLOURS OF BARE PARTS. As in the other races.

Genus ARDEOLA Boie

Ardeola Boie, 1822, Isis von Oken, col. 559. Type, by monotypy, *Ardea ralliodes* Scopoli

Cf. Bock, W.J., 1956, Amer. Mus. Novit. No. 1779: 35-57

Feathers of head, neck and upper breast elongate. Those of the two latter decomposed during the breeding season, when also a crest of elongate, lanceolate feathers develops. Bill stout and about equal in length to middle toe and claw. Tarsus strong, about same length as bill. Tail of twelve feathers, typically broad. Neck shorter than in *Ardea*. Head, neck and back always coloured, but undergoing a complete change of colour in the breeding season.

42. **Indian Pond Heron or Paddybird.** *Ardeola grayii grayii* (Sykes)*Ardea Grayii* Sykes, 1832, Proc. Zool. Soc. London: 158 (Dukhun)

Baker, FBI No. 2229, Vol. 6: 354

Plate 3, fig. 5, facing p. 48

LOCAL NAMES. *Bāglā*, *Āndhā bāglā*, *Chama bāglā*, *Khūnch bāglā* (Hindi); *Konch bāk* (Bengal); *Bōgli* (Mirshikars, Bihar); *Ral puchake* (Gond); *Kūlāthū kōkkū*, *Kūrūthū kōkkū* (Tamil); *Gūddi konga* (Telugu); *Kana kokka*, *Podi kokka* (Sinhala); *Brōku* (Kashmir); *Kūlāmūnti* (Malayalam).

SIZE. Country hen +; length *c.* 46 cm. (18 in.).

FIELD CHARACTERS. An egret-like waterside bird largely snow-white and prominent when in flight, effectively camouflaged earthy brown when at rest.

Adult (non-breeding). Drab. *Above*, head and neck dark brown streaked with yellowish buff. Back, scapulars, and tertiaries, ashy brown with pale yellowish shaft-stripes on the scapulars. *Below*, chin and throat white; upper breast white, streaked with brown. Rest of plumage, including tail, white.

Adult (breeding). Very handsome. *Above*, head and neck light yellowish brown; crown browner. Long recumbent white or buff occipital crest of lanceolate plumes. Back deep maroon with very long decomposed feathers extending over the tail. *Below*, chin and throat white; upper breast ashy brown, the feathers long and somewhat disintegrated. Rest of body, wings, and tail white; tips of first primaries tinged brownish. Sexes alike in breeding and non-breeding plumages.

STATUS, DISTRIBUTION and HABITAT. Resident; shifting locally with drought and flood conditions. Throughout the subcontinent, and Ceylon. Also Andaman, Nicobar, and Laccadive islands. In the plains and sea-board; up to *c.* 1200 m. in the peninsular hills, and *c.* 1500 m. in the Kashmir and Nepal valleys. Affects streams, jheels, marshes, inundated paddyfields, village tanks, stagnant roadside ditches, borrow-pits and puddles, even kutchas wells, and tidal mudflats.

Extralimital. From the Persian Gulf to Burma and Malaysia.

GENERAL HABITS. Usually solitary when feeding, or in small loose parties. Gregarious at roost; colonial when nesting. Its method of hunting is typically heron-like, either standing hunched up and motionless but fully alert on the water's edge or amidst a squelchy puddle, or stalking stealthily, lifting each foot clear of the water and putting it down circumspectly, neck craned forward and bill poised in readiness to jab at the quarry. Observed catching fish by bellyflopping on the water from overhanging stone slab *c.* 1 metre above (Muir, JBNHS 24: 366). Large numbers collect at drying-up village ponds after the monsoon to feast on the concentrating refugee frogs and fish. Rises with a flash of the white wings and flies with deliberate rather lazy flapping, neck partly extended as in the Little Green Heron, not folded back as in the Grey Heron.

FOOD. Frogs, fish, crustaceans, water beetles, and other insects. Mud-skipper or *neota* (*Periophthalmus*) from tidal swamps, and *Ocypoda* crabs from between tidemarks on the sandy seashore specifically recorded. Also among insect food the following identified: *Brachytrypes achatinus*, *Atractomorpha crenulata*, *Oxya* sp., *Crocothemis servillia*, *Pelogonus marginatus*, *Trithemis*

pallidinervis, *Platygomphus dolabratus*, *Dysticus* spp., *Chrotogonus* spp., grasshoppers, dragonfly larvae, crickets, ants, etc.

VOICE and CALLS. A harsh croak when suddenly flushed. Birds in a nesting colony constantly utter a conversational *wa-koo* — very human-like — interlarded with short croaks.

BREEDING. Usually in small groups of its own species, or mixed with night herons, egrets, cormorants, etc. Perhaps less colonial than many others of the family. *Season*, in most parts of the subcontinent May to September; in south India and Ceylon November to February; in Ceylon till August. *Nest*, an untidy structure of twigs, slightly more substantial than a dove's nest. Built in isolated large trees or clumps such as of tamarind or mango, often growing in the midst of a noisy town or village, and not necessarily close to water. Colonies also sited in willows, as in Kashmir, or in babool (*Acacia arabica*) or tamarisk (*Tamarix* sp.) standing in water, the nests between two and four metres above the surface; likewise in mangroves. If undisturbed, the same sites are used year after year and tend to become traditional. *Eggs*, 3 to 5, smooth, fine-textured, typical broad ovals of the family, pale sea green in colour. Average size of one hundred eggs 38.0×28.5 mm. (Baker). Believed to pair for life, but this not proven. Both sexes take part in nest building; apparently the male chiefly responsible for collecting the material which the female puts together. Both sexes incubate and feed the young. Period of incubation 24 days (Lamba, *Pavo* 1(1)—1963). Feeding done by regurgitation as in the Grey and Green Herons (qq.v.), with the same vigorous bill-seizing and demands by the young.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	199-230	60-67	60-64	73-84 mm. . (Baker)

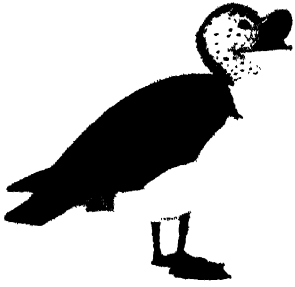
Scheer (loc. cit. *infra*) gives for Indian birds:

	Wing	Bill length	depth at base	Tarsus
♂ ♂	194-230 (210.9)	48-66 (60.6)	12-15 (13.8)	50-63 mm. (56.6)
♀ ♀	182-224 (198.4)	51-66 (58.8)	11-15 (12.9)	49-62 mm. (54.5)

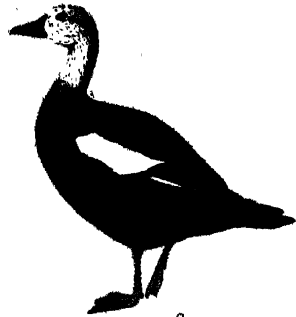
COLOURS OF BARE PARTS. 'Iris lemon yellow. Orbital skin greenish yellow. Bill greenish yellow with blue on base, horny on middle part of culmen, black on top and sides of anterior third. Legs and feet dull green; claws pale horny; pads dingy yellowish white' (Biswas).

PLATE 4

1 *Sarkidiornis m. melanotos*, Nakta (115) ♂. 2 *Cairina scutulata*, Whitewinged Wood Duck (116). 3 *Nettapus c. coromandelianus*, Cotton Teal (114), ♂, breeding; 3a ♂ winter. 4 *Anser a. rubrirostris*, Greylag Goose (81). 5 *Dendrocygna javanica*, Lesser Whistling Teal (88). 6 *Anser indicus*, Barheaded Goose (82). 7 *Tadorna ferruginea*, Brahminy Duck (90), ♂. 8 *Dendrocygna bicolor*, Large Whistling Teal (89). 9 *Anas platyrhynchos*, Mallard (100), ♂, breeding. 10 *Anas p. haringtoni*, Spotbill Duck (98).



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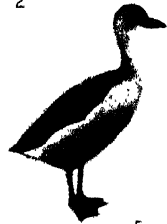
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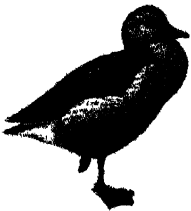
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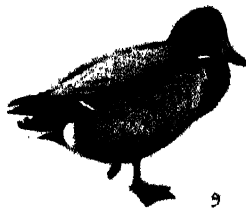
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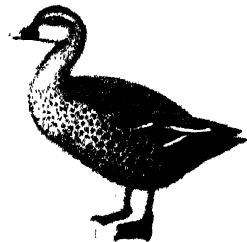
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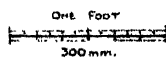
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10



Ch. H. H. H.

In full breeding dress the legs and feet in *some* individuals become bright salmon pink. In the majority there is merely a brightening of the yellow.

42a. Maldivian Pond Heron. *Ardeola grayii phillipsi* Scheer

Ardeola grayii phillipsi Scheer, 1960, Senck. biol. Frankfurt am Main, 41: 145

(Hitadu, Addu Atoll, Maldives)

Not in Baker, FBI

LOCAL NAME. *Hudu rabulli* (Maldivian).

SIZE. Same as 42.

FIELD CHARACTERS. Same as for 42. See Museum Diagnosis.

STATUS, DISTRIBUTION and HABITAT. Race peculiar to the Maldives Is. Found on the southernmost atolls — Addu and Suadiva. Affects freshwater ponds and rain puddles; also tidal mudflats.

GENERAL HABITS, FOOD, VOICE and CALLS. Similar to 42. Recorded as eating frogs, skinks, small fish, shrimps and insects. Has been observed jabbing at large land crabs with the heavy bill.

BREEDING. No information.

MUSEUM DIAGNOSIS. Differs from the nominate form in having a more massive bill in the male, and shorter tarsus in the female. Outermost primaries in adult pure white instead of dusky.

MEASUREMENTS

	Wing	Bill length	depth at base	Tarsus
♂ ♂	207-220 (211.1)	64-68 (65.8)	14.5-16 (15)	54-67 mm. (57.6)
♀ ♀	186-199 (190.6)	53-58 (56.5)	12.5-14 (13.1)	49-52 mm. (50.1)

COLOURS OF BARE PARTS. 'Iris golden yellow. Bill yellow. Legs pale yellow-green becoming deeper yellow in ♂ ♂ and more rose in ♀ ♀ during the breeding season. Weight of type specimen 230 gm.' (Scheer).

43. Chinese Pond Heron. *Ardeola bacchus* (Bonaparte)

Buphus bacchus Bonaparte, 1855, Consp. Av., 2(1) (Malay Peninsula)

Baker, FBI, No. 2230, Vol. 6: 355

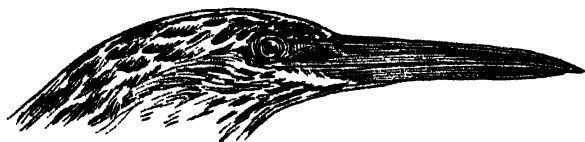
LOCAL NAMES. *Lampra* (Manipur).

SIZE. Indian Pond Heron +; length c. 52 cm. (21 in.).

FIELD CHARACTERS. Slightly larger than Indian Pond Heron and very similar to it in non-breeding plumage.

Adult (breeding). *Above*, head and neck, with long lanceolate nuchal crest, dark maroon-chestnut. Back and some scapulars blackish slaty. *Below*, chin and throat white; elongate breast plumes dark maroon-chestnut, blackish towards ends. Rest of body including wings and tail white; the outer two or three primaries brownish at tip. Sexes alike.

STATUS, DISTRIBUTION and HABITAT. Resident; shifting locally. Eastern Assam, Manipur, East Pakistan, Andaman islands. Affects marshes, and every sort of inland and tidal waters, as the Indian bird (q.v.).



Winter plumage, $\times c. \frac{1}{2}$

Extralimital. China from Kansu and the Tsinling Mts south to Burma, Thailand, Malaysia, Hainan and Borneo. Wanderer to Japan (non-breeding).

BREEDING. Breeds in the eastern Brahmaputra Valley in Assam (Lakhimpur), westward to about Tezpur, in small mixed heronries together with Indian Pond Herons and the usual associates. *Season*, chiefly May to July-August. *Nest and eggs* not different from those of the Indian bird, the latter 3 to 5 pale sea green. Average size of 50 eggs 37.7×28.4 mm. (Baker).

MUSEUM DIAGNOSIS. Non-breeding plumage differs from *A. grayii* only in being somewhat more brown and buff on the head and neck, and rather deeper brown on back and scapulars.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	195-238	61-69	60-64	72-90 mm. (Baker)

COLOURS OF BARE PARTS. Iris deep golden yellow. Orbital skin greenish yellow. Bill yellow, blackish on terminal quarter, bluish at base. Legs and feet yellowish green, the soles still paler; possibly as in *A. grayii* salmon pink in some breeding individuals, but not recorded.

Genus BUBULCUS Bonaparte

Bubulcus Bonaparte, 1855, Comp. Rend. Acad. Sci. Paris, 40: 722. Type, by tautonymy, *Ardea ibis* Linnaeus = *Ardea bubulcus* Audouin

Included by some authors in *Ardeola*. Differs from *Egretta* by its shorter bill and feet. Naked portion of tibia shorter than inner toe without claw. Breeding plumage very distinctive, consisting of golden buff hair-like plumes on head and back.

Only a single species inhabiting the warmer parts of Europe and Asia, and all Africa. Has spread to America within recent years.

44. Cattle Egret. *Bubulcus ibis coromandus* (Boddaert)

Cancroma coromanda Boddaert, 1783, Table Pl. enlum.: 54 (Coromandel)

Baker, FBI No. 2226, Vol. 6: 349

Plate 3, fig. 7, facing p. 48

LOCAL NAMES. *Sūrkhia-bāglā*, *Badāmi-bāglā*, *Doria bāglā*, *Gāi bāglā* (Hindi); *Go bāk*, *Gāi bāk* (Bengal); *Samti kongā* (Telugu); *Unni kokku* (Tamil, Ceylon); *Harak-kokka* (Sinhala); *Jobogali* (Assam); *Gochāndi khāo* (Marathi); *Kurk pakkhi* (Sind); *San-dung-il* (= 'following after cattle' — Manipur); *Kālimānti* (Malayalam).

SIZE. Village hen; length c. 51 cm. (20 in.).

FIELD CHARACTERS. In non-breeding plumage a lanky snow-white bird very similar to Little Egret, usually seen in attendance on grazing cattle, not necessarily near water. Always identified from Little Egret by *yellow* bill *contra* black. In breeding plumage unmistakable: golden buff on head, neck, and back, the feathers disintegrated and hair-like. Sexes alike.



× c. 1/2

STATUS, DISTRIBUTION and HABITAT. Resident, but in the Himalayas migrating to lower elevations in winter. Throughout the subcontinent, Ceylon, and the Andaman, Nicobar, Laccadive, and Maldive islands. Plains, and cultivated Himalayan duns and valleys up to at least 1500 m. altitude (Nepal), and to c. 1200 m. (possibly higher) in the peninsular hills and plateaux (e.g. Sahyadris, Nilgiris), often as a daily commuter from lower levels. Almost invariably in attendance on grazing animals, domestic or wild.

Extralimitally the race *coromandus* occurs in Burma, the Indochinese countries, Malaysia, S. China, Korea, S. Japan, Formosa, Hainan, Philippines, Sunda islands, Celebes (Sulawesi), and Ceram as resident, migrant, or on passage.

GENERAL HABITS. Gregarious. Usually seen in attendance on grazing village cattle on damp grassy margins of tanks as well as dry fallows and forest glades far removed from water. Also with grazing herds of wild buffaloes, or rhinoceros wallowing in swamps and *bheels* in Assam. The birds stand around amongst or on the backs of the animals fearlessly, or stalk alongside running energetically in and out between their legs and pouncing on grasshoppers and other insects disturbed by the animals' progress. Every now and again the long flexible neck and pointed bill lunges out at the fleeing quarry. Sometimes a bird will complacently settle on and walk along the body of a wallowing animal to explore the inside of its ear or some less accessible part. Blood-sucking flies, ticks and other parasitic insects are picked off the sides and bellies of the grazing animals by the birds springing up for them as they scurry alongside, or from other parts while riding upon the animals' heads or backs. To capture bluebottle flies (*Musca vomitoria*) off the low herbage, the bird poises its bill, cranes forward and sways its neck comically from side to side as if taking aim, and jabs at the insect.

Besides attending on cattle they sometimes collect in large gatherings (of up to several hundred strong) at inundated ploughed fields where the freshly turned up soil provides ample feeding. They consort freely with vultures at slaughter-houses and animal carcase dumps on the outskirts of towns, for the flies and maggots these unsavoury places provide. Cattle

egrets have favourite roost trees, shared with crows, mynas, and other birds, to which they resort every evening flying in a more or less disorderly rabble in the characteristic heron style — neck folded back, head hunched between the shoulders, and legs tucked under the tail, projecting behind like a rudder.

FOOD. Chiefly insects. From stomach contents the following have been identified: *Sarcophagidae*, *Agrotis* sp. larvae, *Chrotogonus* spp., *Acridium aeruginosum* and other grasshoppers, carabid beetles, earth-worms, and flies (*Muscidae*). To a minor extent tadpoles, frogs and lizards.

VOICE and CALLS. A low croak uttered when one bird is supplanting another, especially at nest colony. Normally very silent.

BREEDING. *Season*, mainly June to August in N. India; November to February in the south; February to July in Ceylon. In small to medium sized colonies of its own, but more usually mixed with cormorants, night herons, egrets, etc., in large trees such as mango, tamarind, or peepul, often standing in the midst of a noisy bazaar — even within populous cities like Bombay, Madras, and Calcutta — not necessarily close to water. *Eggs*, 3 to 5, broad ovals, very pale sea green, almost white or skim-milk blue. Average size of 80 eggs 44.1×36.5 mm. (Baker). Both sexes share in nest building, incubation, and feeding the young by regurgitation as in Purple Heron (q.v.). Incubation period undetermined.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	240–260	50–66	82–92	83–96 mm.

Males average a little larger than females.

COLOURS OF BARE PARTS. Iris golden yellow. Bill yellow; orbital and facial skin greenish yellow. Legs and feet black, the upper parts of the tibia, and soles, yellow or greenish yellow (Baker).

Genus EGRETTA Forster

Egretta T. Forster, 1817, Syn. Cat. Brit. Bds.: 59. Type, by monotypy, *Ardea garzetta* Linnaeus

Contains those egrets which in the breeding season develop ornamental plumes on the back as well as, in some cases, on the breast and head. All are white at all seasons with the exception of *E. gularis* and *E. sacra* which are dimorphic with also slaty phase. Smaller than birds of the genus *Ardea* and with much slenderer bills and thinner necks. In winter plumage the species can be distinguished chiefly by size.

See Key, p. 50.

45. Large Egret or Great White Heron. *Egretta alba alba* (Linnaeus)

Ardea alba Linnaeus, 1758, Syst. Nat., ed. 10, 1: 144 (in *Europa* = Sweden)

Baker, FBI No. 2222, Vol. 6: 345

LOCAL NAMES. Same as next.

SIZE. Grey Heron \pm ; length c. 96 cm. (38 in.); standing c. 75 cm. to top of head.

FIELD CHARACTERS. A large lanky snow-white heron-like marsh bird with bare blackish legs, long slender neck and head, and pointed black-and-yellow or yellow bill. In the breeding season a bunch of ornamental filamentous plumes (aigrettes) develops on the back, falling over beyond the tail. Sexes alike. Solitary.

STATUS, DISTRIBUTION and HABITAT. Rare winter straggler into West Pakistan and Uttar Pradesh. Affects jheels and marshes.

Extralimital. Breeds in SE. Europe, W. and N. Asia to SE. Siberia, N. China, N. Japan.

GENERAL HABITS. See next.

MUSEUM DIAGNOSIS. For plumages etc. see Witherby 1939, 3: 139.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	410-465	110-135	170-215	140-185 mm.
♀♀	400-450	110-132	—	—

COLOURS OF BARE PARTS. Iris yellow. Bill black, base yellow (ad. summer), all yellow (ad. winter & juv.); lores and round eyes green; legs and feet black-brown, sides yellowish, toes greenish black (Witherby).

46. Eastern Large Egret. *Egretta alba modesta* (J. E. Gray)

Ardea modesta J. E. Gray, 1831, Zool. Misc.: 19 (India)

Baker, FBI No. 2223, Vol. 6: 346

Plate 3, fig. 2, facing p. 48

LOCAL NAMES. *Mālīng bāglā*, *Tūra bāglā* (?). *Tar bāglā*, *Bādā bāglā* (Hindi); *Dhār bāk*, *Bādā bāk* (Bengal); *Bōr bōg* (Assamese in Nowgong); *Loklenha* (= 'standing in streams' — Manipur); *Peddā tellū konga* (Telugu); *Mala konga* (Gond); *Peria nellāi kokku* (Tamil, Ceylon); *Loku sudu kokka*, *Badadel kokka* (Sinhala); *Bāglo āchho* (Sind); *Perūmūnti* (Malayalam).

SIZE. Grey Heron —; length c. 91 cm. (36 in.).

FIELD CHARACTERS. Slightly smaller, otherwise identical with the foregoing and indistinguishable from it. Size variable and deceptive; thus in non-breeding plumage confusion between some individuals and the Smaller Egret easily possible. In breeding season, especially during various nest ceremonies, the diaphanous lacclike plumes of the back are often erected and spread out in 'showers' — a halo of mist! No crest. Sexes alike.

STATUS, DISTRIBUTION and HABITAT. Resident and nomadic, shifting locally with water conditions. Throughout the subcontinent and Ceylon. Nepal Valley (?) and lowlands, and Maldivé Islands in winter. Not recorded in the Andaman, Nicobar, and Laccadive Is. Low country — at jheels and marshes, rivers, tidal estuaries, etc.

Extralimital. Burma, eastward through the Indochinese countries and Malaysia to S. and C. China, S. and C. Japan, south and east to Australia.

GENERAL HABITS. Usually solitary, and seldom more than two or three separated individuals amongst feeding groups of the two smaller species. More gregarious when nesting, but everywhere less abundant, more widely scattered, and less communal than the other egrets. Behaviour and feeding

habits very similar to the Grey Heron's (q.v.). Flight with rather slow deliberate flapping of the broad wings, typically heron-like — neck telescoped, head pulled in between the shoulders, legs trailing behind. When disturbed and suddenly taking off, and also during short foraging hops, the long slender neck is fully extended, and twisted this way and that, seemingly to counterbalance the swaying legs and produce an even keel.

FOOD. Fish, frogs, crustaceans, water insects, etc.

VOICE and CALLS. Except for an occasional throaty croak when one bird is supplanting a rival, very silent.

BREEDING. Colonial, in mixed heronries of storks, darters, cormorants, Smaller and Little Egrets, etc. *Season*, July to September in Sind and N. India; November to February in the south; December to May in Ceylon. *Nest*, a flimsy twig platform, c. 25–35 cm. in diameter, seemingly too small for the bird. Built in trees of medium to large size standing by themselves or in a grove or copse, either partially submerged or on raised ground away from water. In the latter case it may be a large peepul or tamarind tree in the midst of a noisy town or overhanging a public highway, with as many as 40 to 50 nests of this species in addition to others'. Babool (*Acacia arabica*) and kandi (*Prosopis spicigera*) trees in the Keoladeo Ghana Sanctuary of Rajasthan, and tamarisks in the riverain and canal areas of Sind, are commonly patronized. The nests here are scattered amongst those of other species in the heronry without any suggestion of segregation. *Eggs*, 3 or 4, smaller but otherwise identical with those of the Grey Heron. Average size of 60 eggs 54.0×38.6 mm. (Baker). Both sexes build the nest, incubate, and feed the young by regurgitation, as described. Incubation period unrecorded; in the nominate race (*alba*) it is said to be 'probably 25–26 days'.

MUSEUM DIAGNOSIS. For description of plumages etc. see Witherby 1939, 3: 139 for the nominate race, from which *modesta* differs only in being smaller. Generally distinguishable from *Egretta i. intermedia* (next species) by its wing length of over 350 mm. and tarsus over 160 mm. *contra* wing under 350 and tarsus under 150 mm. But females are smaller, and furthermore there is considerable individual variation in size, sometimes producing an overlap or near-overlap in these measurements. Therefore, identifying individual examples in non-breeding plumage is not always satisfactory, and in some cases even impossible.

MEASUREMENTS

		Wing	Bill (from feathers)	Tarsus	Tail
China specimens (Foochow)	5 ♂♂	360–370	109–111	173.5–175 (one 163)	139–150 mm.
	4 ♀♀	345–361	95–104	152–157	130–143 mm.

Breeding males have the train of dorsal ornamental plumes projecting from about 92 to 165 mm. beyond tip of tail; females about 38 to 90 mm. (La Touche 1931–4, 2: 446).

		Wing	Bill (from skull)	Tarsus	Tail
Indian specimens (Gujarat & Ceylon)	6 ♂♂	355–375	103–117	146–165	125.5–143 mm.
	6 ♀♀	337–365	97–100.5	136–160	120–138 mm. (SA, HW)

Baker gives the range of *modesta* ♂ ♀ as Wing 354-391; bill (from feathers) 104-116 mm. and says 'Bill much more slender than in *E. a. alba*'.

COLOURS OF BARE PARTS. Breeding: Iris bright lemon-yellow. Bill black, yellow at base. Orbital skin and lores bright verdigris green. Legs: tibia bright rose-pink; tarsus and feet pinkish brown or black. Non-breeding: Bill orange-yellow. Orbital and facial skin greenish yellow. Legs, feet, and claws, black.

MISCELLANEOUS. Longevity, *E. a. alba* (from ringing data): c. 10 years (Ring, 1962, 33: 148).

47, 48. **Smaller or Median Egret.** *Egretta intermedia intermedia* (Wagler)

Ardea intermedia Wagler, 1829, Isis von Oken, col. 659 (Java)

Baker, FBI No. 2224, vol. 6: 347

LOCAL NAMES. *Pātāngkhā bāglā*, *Pātukhā bāglā*, *Kārchīā bāglā* (Hindi); *Korché bāk* (Bengal); *Bāglo āchho* (Sind); *Lāng khong sāng* (Manipur); *Vellāi kokku* (Tamil); *Sudu kokka* (Sinhala); *Tellā kongā* (Telugu).

SIZE. Length c. 45 cm. (26 in.).

FIELD CHARACTERS. Slightly smaller, otherwise very like Eastern Large Egret; non-breeding birds often indistinguishable from it. In breeding plumage presence of decomposed filamentous plumes on *back as well as breast* diagnostic. No crest. Sexes alike. Less solitary than Large, less gregarious than Little Egret.

STATUS, DISTRIBUTION and HABITAT. Resident and nomadic, shifting locally with water conditions. Throughout the subcontinent, Ceylon, Andaman and Nicobar islands. Low country and plateaux; to about 1400 m. altitude in Nepal Valley. Affects jheels, marshes, inundations; also coastal backwaters, tidal estuaries, and mangrove swamps.

Extralimital. Burma, Thailand, Indochinese countries, Malaysia, east to China and Japan, south to Greater Sunda Is. and the Philippines. Resident in some of the areas, migratory in others.

GENERAL HABITS. Not different from Large Egret except that it is somewhat more social even in the non-breeding season, occasionally seen in small flocks.

BREEDING. Colonial, in mixed heronries with the usual associates. Season, nest, and nest sites as in the previous species. In Sind inundated tamarisk forest, and in Kutch and other coastal areas tidal mangrove forests are commonly resorted to for nesting. Eggs, 3 or 4, sometimes 5, pale sea green, smooth-surfaced broad ovals. Average size of 60 eggs 47.6 × 35.8 mm. (Baker). As in other egrets, both sexes share all domestic chores. Incubation period undetermined, but believed to be about 21 days.

MUSEUM DIAGNOSIS. For distinguishing this from *E. a. modesta* see remarks under that species.

Egretta intermedia palluca Deignan, 1947, Proc. Biol. Soc. Washington, 60(1): 97 (Muang Chiang Rai, Siam) is based on the mistaken premise that eastern birds retain a yellow bill at all seasons. La Touche (1931-4, 2: 447), and Smythies (1953: 529) both describe the bill as black in the breeding season, and the former as 'yellow, pointed with black in winter', therefore exactly as in typical *intermedia* from western India. There seems no justification for retaining this race.

MEASUREMENTS. Baker gives as follows:

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	304-333 (once 354)	73-97 (twice 68, once 118)	122-148 (once 114)	116-135 mm.

Three specimens from Travancore, Ceylon and Rajasthan measure:

2 ♂ wing 302, 316; bill (1) 94 (from skull), (1) 77.5 (from feathers); tarsus 111.5, 120; tail 121.5, 124 mm. 1 ♀ wing 294; bill (from feathers) 69; tarsus 102; tail 117 mm.

COLOURS OF BARE PARTS. Iris lemon-yellow. Bill black, yellow at base (breeding); lemon-yellow, dusky at tip browner at base (non-breeding). Naked lores and infra-orbital skin yellowish green (breeding); yellowish (non-breeding). Legs and feet dusky black, greenish on the joints and tibia. Rose-pink or salmon-pink in legs of breeding birds unrecorded in this species.

49. **Little Egret.** *Egretta garzetta garzetta* (Linnaeus)

Ardea Garzetta Linnaeus, 1766, Syst. Nat., ed. 12, 1: 237

(‘ Oriente ’ = northeast Italy)

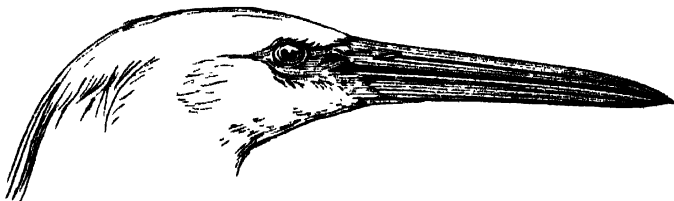
Baker, FBI No. 2225, Vol. 6: 348

Plate 3, fig. 3, facing p. 48

LOCAL NAMES. *Kilchia* or *Kärchiā bāglā* (Hindi); *Bārāro* (Sind); *Chhota korchē bāk* (Bengal); *Teteri bog* (Assamese in Nowgong); *Chinnā tellū konga* (Telugu); *Chinnā vellāi kokku* (Tamil, Ceylon); *Sudu kokka* (Sinhala); *Chinnamūnti* (Malayalam).

SIZE. Village hen ±, with longer neck and legs; length *c.* 63 cm. (25 in.).

FIELD CHARACTERS. A lanky snow-white waterside bird — smaller replica of the Large and Median Egrets. Similar also to non-breeding Cattle Egret but distinguished from it at all seasons by *black v. yellow* bill, parti-coloured legs and feet (black and yellow), and also usually by habitat. In breeding season develops a drooping nuchal crest of two long narrow plumes in addition to filamentous ornamental feathers on both back (scapulars) and breast; the latter less decomposed. Sexes alike.



× *c.* $\frac{1}{2}$

STATUS, DISTRIBUTION and HABITAT. Resident, shifting locally with water conditions. Throughout the subcontinent, chiefly lowlands and plateaux; to about 1400 m. altitude in the Himalayas (Nepal Valley) and at least 900 m. in the peninsular hills. Also Ceylon, Andaman, Nicobar, Laccadive (?), and Maldivé islands. Affects inland waters — marshes,

jheels, inundated paddyfields, etc. Rarely tidal estuaries, mudflats and backwaters; hardly ever the seashore.

Extralimital. S. and E. Europe, N. and E. Africa, Middle East, Iran, Afghanistan, Burma, Malaysia, east to China, Hainan, and Japan. Partly migratory.

GENERAL HABITS. More gregarious than the two larger white egrets, usually in flocks on the edge of water or wading in the shallows. Still-hunts or stalks prey in the characteristic heron manner, lunging out with its flexible neck and dagger bill to seize the quarry. Flies with steady but leisurely flaps of the broad rounded wings, head and neck drawn in when commuting or on long flights. Roosts on favourite trees ('rookeries') in association with other species.

FOOD. Fish, frogs, crustaceans, water insects, etc.

BREEDING. Colonial, in mixed heronries. *Season*, July to September in Sind and N. India; November to February in the south; December to May in Ceylon — dependent on water conditions. *Nest*, the typical flimsy cupped structure of twigs — only slightly more substantial than a dove's — placed 2 to 6 metres up in a tree, single or one of a grove standing in a tank or jheel, or on dry land; sometimes away from water and in the midst of a village or town. The nests are often close together, even touching others of the same or different species. Inundated tamarisk forests in Sind, and partially submerged babool and kandi jungle in monsoon-flooded semi-desert areas in NW. India (Kutch, Rajasthan, etc.) are favourite nesting sites. Similarly situated *Barringtonia racemosa* groves and *Pandanus* thickets in South India (Vedanthangal in Madras; Srirangapatnam in Mysore), and mangroves in the Bengal Sunderbans are also regularly patronized. But smaller heronries are scattered all over the country. *Eggs*, 3 to 5, typically heron, pale blue-green broad ovals with a smooth texture. Average size of 60 eggs 44.4×31.7 mm. (Baker). As in the family, both sexes share all the domestic chores. Feeding of young etc. as in the species described. Incubation period 21—25 days.

MUSEUM DIAGNOSIS. For details of plumages etc. see Witherby 1939, 3: 141.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	257-289	79-91	99-110	92-108 mm. (Baker)
		(from skull)		
♂ ♂	260-295	85-92	100-110	90-110 mm.
♀ ♀	(240) 250-282	78-90	—	—
				(Witherby)

COLOURS OF BARE PARTS. (Breeding and non-breeding) Iris yellow. Facial skin greenish yellow. Bill black, the gape and base of lower mandible yellowish. Tarsus and tibia black; feet yellow, greenish yellow, or mixed black and yellow; soles almost all yellow. In a female in breeding condition from Nepal, 'Ocular skin bluish purple. Bill black, base of upper mandible bluish purple, lower mandible with a small basal area of bluish purple. Legs black, feet orange-yellow' (Ripley).

MISCELLANEOUS. *Egret Farming.* Some years ago this species used to be extensively and lucratively farmed by the *mirbahars* or *mohanas* (inland

fisherfolk) of Sind on many of the local dhands (jheels) for their valuable ornamental plumes known to the trade as 'aigrettes' or 'ospreys'. The birds were pinioned and housed in spacious pens of reed matting — 50 or 60 couples to a pen — where they moved about freely and became quite tame. They were well fed and cared for, and between March and September they paired off, built their own nests from twigs provided by the owners, laid from 3 to 5 eggs, and incubated them. After hatching the chicks were left with the parents for about a week, then removed and hand reared. They attained maturity in about 12 months. The parents commenced laying a second clutch almost immediately after the removal of the brood, and soon brought up another family. In this way they sometimes produced 4 and even 5 successive clutches during the season. The dorsal plumes were extracted in a humane manner without injury to the birds. There were four pluckings — one every three months — and each bird seldom produced less than a *tola* (11.66 gm.) in the year. Round about the year 1914, the feathers fetched from Rs. 10 to Rs. 15 per *tola* in the Indian market (even '10 to 28 times their weight in silver'), but as much as £15 per oz. (28.35 gm.) when smuggled to Europe, a trade which was apparently practised on a large scale by specialists in the business! The lack of official encouragement to this profitable cottage industry by a controlled relaxation of the ban on export of wild birds' plumage in favour of genuinely farm-produced feathers — but even more the change in women's fashions in clothing — has virtually put an end to the egret-farming industry. But to our knowledge some small egret farms existed in Sind up to 1930, and some may possibly survive to this day. While the farming concerned the Little Egret almost exclusively, before statutory protection was given enormous numbers of egrets of all species were slaughtered by gangs of professional hunters, armed with snares and muzzle-loading guns, who scoured the countryside visiting one breeding heronry after another and systematically slaying the adults, often leaving the nestlings, to starve and perish. In the more accessible areas this vandalism had reduced the egret population to the verge of extinction. The species that suffered most were the three white egrets — *E. alba*, *E. intermedia* and *E. garzetta*, but to a lesser degree also the Cattle Egret (*Bubulcus ibis*) and the Reef Heron (*Egretta gularis*). (For detailed accounts see articles on 'Egret Farming in Sind', JBNHS 23: 161; 27: 944; 28: 748, 751.)

50. **Indian Reef Heron.** *Egretta gularis schistacea* (Hemprich & Ehrenberg)

Ardea (Leptorodas) schistacea Hemprich & Ehrenberg, 1832, Symb. Phys. Avcs, (p. 12), pl. 6 (Red Sea)

Ardea Asha Sykes, 1832, Proc. Zool. Soc. London : 157 (Dukhun)

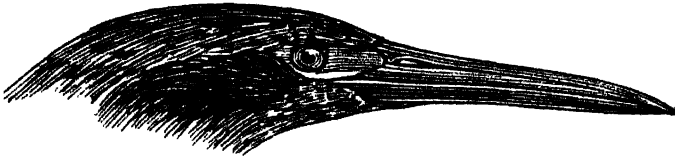
Baker, FBI No. 2228, Vol. 6: 353

Plate 5, fig. 3, facing p. 96

LOCAL NAMES. *Kālā bāglā* (Hindi); *Thirāmūnti* (Malayalam); *Theerāpū konga* (Telugu); *Kārāi kokka* (Tamil).

SIZE. Same as Little Egret; length c. 63 cm. (25 in.).

FIELD CHARACTERS. General effect as of Little Egret, but dimorphic. Adult in two colour phases: (1) pure white, (2) slaty grey to slaty blue-black, with glistening white throat and upper foreneck. Some examples intermediate, partly white partly slaty. In breeding plumage a nuchal crest of two elongated narrow plumes and same sort of filamentous plumes on back and breast as in Little Egret. White phase indistinguishable from Little Egret except by more solitary habit and seacoast habitat. Sexes alike in both colour phases.



× c. $\frac{1}{2}$

Sub-adult (dark phase?). *Above*, pale ashy grey. *Below*, chin and throat white; upper foreneck grey; lower foreneck, breast and underparts including under tail-coverts and inner thighs, white.

STATUS, DISTRIBUTION and HABITAT. Resident, nomadic, and local migrant (see Breeding). Northern shores of the Arabian Sea and seaboard of West Pakistan (where very common); shores of western India south to Kanyakumari, and of northwest Ceylon; Laccadive Is. Rare on the eastern coast, only recently recorded as resident and breeding from east of Nellore and in the neighbourhood of Pulicat lagoon (Kirkpatrick, JBNHS 58: 275). Affects sandy and rocky seashores, tidal lagoons and mudflats, and mangrove swamps. Occasionally strays a few miles inland to freshwater swamps.

Extralimital. Coasts of Red Sea, Gulf of Aden, and Persian Gulf.

GENERAL HABITS. Solitary and somewhat crepuscular. Occasional separated twos and threes, both colour phases together. Gregarious at nest colonies. Wades stealthily into shallow surf on tidal mud, or among rock pools left by receding tide, and secures prey by jabbing at it with the pointed bill and flexible neck. Often seen sitting hunched up on a partly submerged rock or fishing stake patiently waiting for the tide to ebb to resume hunting. While stalking in the shallow surf, sometimes suddenly raises unopened wings at the armpits, level with the back, crouching forward furtively on flexed legs (as in a bird about to settle on eggs), wading deeper almost to belly, peering intently into the water, neck craned out and bill poised in readiness. From time to time also suddenly flicks the wings open and shut, quite obviously to stampede lurking or 'frozen' prey by the sudden movement. Flight and general behaviour not different to Little Egret's, though usually more mobile and active when hunting.

FOOD. Fish, crabs, molluscs, etc. The mudskipper (*Periophthalmus*), procured in tidal mud, is a regular food item of adults and nestlings.

VOICE and CALLS. Very silent. A short throaty croak sometimes heard when one bird is supplanting a rival.

BREEDING. Colonial, usually in segregated heronries of own species, but also mixed with other egrets and pond and night herons. *Season*, between

April and August in Sind (Karachi city and harbour) and Kutch (Gul of Kutch); end of May in Ceylon (Chilaw; rare). No record elsewhere in between, therefore possibly migrates locally to special areas. *Nest*, the usual untidy structure of twigs, occasionally plucked green and with leaves still attached. In large trees such as peepul (*Ficus religiosa*), jamun (*Eugenia jambolana*), Rain Tree (*Pithecelobium dulce*) and others standing on dry ground, with the colony overflowing on to adjacent trees. But the normal site is coastal mangrove swamps subject to inundation at high tide, the nests being placed in trees and bushes of *Rhizophora*, *Avicennia*, and *Sonneratia*, etc. Both the dark and pale phases breed together in the same colony, but white mated to white and slaty to slaty only; no evidence here of slaty and white birds paired together as in Africa. *Eggs*, 3 or 4, exactly like those of the Little Egret in colour, shape, and texture of shell. Average size of 50 eggs 44.9×34.3 mm. (Baker). Both sexes share all the domestic chores. As in most herons the male collects the twigs and fetches them to the nest where the female puts them together. Incubation commences with the first egg, accounting for marked disparity in growth of young in the same brood. Nest-feeding done by regurgitation as described. Period of incubation undetermined. The nests contain either all white or all grey chicks each. Only a single case observed of 2 white, 1 grey (one of the parents was white, the other not seen). None of the white chicks are snow-white, all being more or less dappled with grey, thus different from Little Egrets'. No adult white bird retains the grey dappling, but adult slaty birds frequently show small asymmetrical white patches on the wings.

MUSEUM DIAGNOSIS. In skins extremely difficult to distinguish *E. garzetta garzetta* from white phase of *E. gularis schistacea*. Proportions and colours of legs and toes (particoloured) the same in both. Plumages both breeding and non-breeding also identical, including the ornamental plumes. The only constant difference is: bill black in the always white *E. garzetta garzetta* against horny brown or even yellowish in *E. gularis schistacea*, whether in the dark or the white phase. It has been suggested that the dimorphic *E. g. schistacea* may only be ecological populations of *E. g. garzetta* adapted to a marine habitat. Contrary to experience in India, dark and white birds often found paired together in the same colonies in Africa, and dark and white chicks in the same nest. Furthermore, in East Africa *E. g. garzetta* has several colour phases — pale lavender grey, sooty grey, dark sooty grey, and blackish slate, with intermediates. The problem of these colour phases is not properly understood. The different coloration does not depend on age or sex.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	267-301	94-101	97-102	102-112 mm. (Baker)

COLOURS OF BARE PARTS. Variable. Adult: Iris yellow. Bill horny brown above, yellowish at base and on lower mandible; or largely bright yellow (in slaty phase). Legs and feet particoloured as in *E. garzetta*: tarsus greenish black; toes yellowish brown (dark phase), largely yellow or greenish yellow (white phase).

In small nestlings, naked skin between feather buds, and apteria, yellowish grey-green. Legs and feet yellowish green and brown.

Iris greenish grey in very young; lighter grey (almost whitish) in older nestlings.

51. **Eastern Reef Heron.** *Egretta sacra* (Gmelin)*Ardea sacra* Gmelin, 1789, Syst. Nat. 1(2): 640 (Tahiti)

Baker, FBI No. 2227, Vol. 6: 351

LOCAL NAMES. Unrecorded.

SIZE. Length *c.* 58 cm. (23 in.).

FIELD CHARACTERS. Slightly smaller than the last, otherwise of same general effect and maritime habitat.

Adult. Also dimorphic like No. 50: (1) pure white, (2) dark slaty grey or slaty black, with a white streak down middle of chin and throat. In breeding plumage both phases distinguishable from *E. g. schistacea* by a bushy nuchal crest, *contra* crest of two lanceolated plumes in the latter. Feathers of lower foreneck long, lanceolate, overhanging breast. Long lanceolate plumes on back (scapulars and interscapulars) reaching to middle of tail, ending in paler slaty grey than rest of plumage. Sexes alike.

Sub-adult. Pied or mottled, in intermediate colour stages.

STATUS, DISTRIBUTION and HABITAT. Resident in the Andaman and Nicobar islands. Affects rocky portions of the coasts.

Extralimital. From the eastern coasts of the Bay of Bengal eastward — Burma, Malaysia, to the coasts of southern China Sea, S. Korea, S. Japan, Philippines, Sunda Islands, Moluccas, Celebes, New Guinea, South Pacific islands, N. Australia, New Zealand.

GENERAL HABITS. Very similar to the last. Solitary. Keeps to the rocky sea coast and squelchy tidal mud exposed at low water, or sits hunched up on a partially submerged rock or mangrove tree waiting for the ebb.

FOOD. Fish, especially the mudskipper (*Periophthalmus*), crabs, and occasionally insects, such as grasshoppers, obtained on bare ground above tide level.

VOICE. An occasional 'grunted croak or *ork* when feeding, presumably to signalize the acquisition of an unduly tasty morsel'. Also a longer harsher, *arrk* when alarmed (Gibson-Hill). Normally silent.

BREEDING. Colonial. *Season*, May to July and up to September. *Nest*, the usual rough untidy stick platform. Placed on rocks in hollows and crevices, in stunted *Ficus* trees, low thorny bushes up to a metre from the ground, or more commonly among mangrove trees in creeks, sometimes just above high-water mark (B. B. Osmaston). *Eggs*, 3 or 4, pale sea green, typical of the herons. Average size of 50 eggs 44.8 × 33.3 mm. (Baker).

MUSEUM DIAGNOSIS. For details of plumages, and a very full discussion of the colour phases etc., see A. O. Hume 1874, *Stray Feathers*, 2: 304-9.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	250-293	70-86	72-77	93-98 mm. (Baker)

COLOURS OF BARE PARTS. Variable. Iris yellow. Bill horny brown above, yellowish at base and on lower mandible; often yellow all over in white birds. Legs varying from pale yellowish green (in white birds) to deep dull greenish or nearly black (in dark individuals).

April and August in Sind (Karachi city and harbour) and Kutch (Gul of Kutch); end of May in Ceylon (Chilaw; rare). No record elsewhere in between, therefore possibly migrates locally to special areas. *Nest*, the usual untidy structure of twigs, occasionally plucked green and with leaves still attached. In large trees such as peepul (*Ficus religiosa*), jamun (*Eugenia jambolana*), Rain Tree (*Pithecelobium dulce*) and others standing on dry ground, with the colony overflowing on to adjacent trees. But the normal site is coastal mangrove swamps subject to inundation at high tide, the nests being placed in trees and bushes of *Rhizophora*, *Avicennia*, and *Sonneratia*, etc. Both the dark and pale phases breed together in the same colony, but white mated to white and slaty to slaty only; no evidence here of slaty and white birds paired together as in Africa. *Eggs*, 3 or 4, exactly like those of the Little Egret in colour, shape, and texture of shell. Average size of 50 eggs 44.9×34.3 mm. (Baker). Both sexes share all the domestic chores. As in most herons the male collects the twigs and fetches them to the nest where the female puts them together. Incubation commences with the first egg, accounting for marked disparity in growth of young in the same brood. Nest-feeding done by regurgitation as described. Period of incubation undetermined. The nests contain either all white or all grey chicks each. Only a single case observed of 2 white, 1 grey (one of the parents was white, the other not seen). None of the white chicks are snow-white, all being more or less dappled with grey, thus different from Little Egrets'. No adult white bird retains the grey dappling, but adult slaty birds frequently show small asymmetrical white patches on the wings.

MUSEUM DIAGNOSIS. In skins extremely difficult to distinguish *E. garzetta garzetta* from white phase of *E. gularis schistacea*. Proportions and colours of legs and toes (particoloured) the same in both. Plumages both breeding and non-breeding also identical, including the ornamental plumes. The only constant difference is: bill black in the always white *E. garzetta garzetta* against horny brown or even yellowish in *E. gularis schistacea*, whether in the dark or the white phase. It has been suggested that the dimorphic *E. g. schistacea* may only be ecological populations of *E. g. garzetta* adapted to a marine habitat. Contrary to experience in India, dark and white birds often found paired together in the same colonies in Africa, and dark and white chicks in the same nest. Furthermore, in East Africa *E. g. garzetta* has several colour phases — pale lavender grey, sooty grey, dark sooty grey, and blackish slate, with intermediates. The problem of these colour phases is not properly understood. The different coloration does not depend on age or sex.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	267–301	94–101	97–102	102–112 mm. (Baker)

COLOURS OF BARE PARTS. Variable. Adult: Iris yellow. Bill horny brown above, yellowish at base and on lower mandible; or largely bright yellow (in slaty phase). Legs and feet particoloured as in *E. garzetta*: tarsus greenish black; toes yellowish brown (dark phase), largely yellow or greenish yellow (white phase).

In small nestlings, naked skin between feather buds, and apteria, yellowish grey-green. Legs and feet yellowish green and brown.

Iris greenish grey in very young; lighter grey (almost whitish) in older nestlings.

51. **Eastern Reef Heron.** *Egretta sacra* (Gmelin)*Ardea sacra* Gmelin, 1789, Syst. Nat. 1(2): 640 (Tahiti)

Baker, FBI No. 2227, Vol. 6: 351

LOCAL NAMES. Unrecorded.

SIZE. Length *c.* 58 cm. (23 in.).

FIELD CHARACTERS. Slightly smaller than the last, otherwise of same general effect and maritime habitat.

Adult. Also dimorphic like No. 50: (1) pure white, (2) dark slaty grey or slaty black, with a white streak down middle of chin and throat. In breeding plumage both phases distinguishable from *E. g. schistacea* by a bushy nuchal crest, *contra* crest of two lanceolated plumes in the latter. Feathers of lower foreneck long, lanceolate, overhanging breast. Long lanceolate plumes on back (scapulars and interscapulars) reaching to middle of tail, ending in paler slaty grey than rest of plumage. Sexes alike.

Sub-adult. Pied or mottled, in intermediate colour stages.

STATUS, DISTRIBUTION and HABITAT. Resident in the Andaman and Nicobar islands. Affects rocky portions of the coasts.

Extralimital. From the eastern coasts of the Bay of Bengal eastward — Burma, Malaysia, to the coasts of southern China Sea, S. Korea, S. Japan, Philippines, Sunda Islands, Moluccas, Celebes, New Guinea, South Pacific islands, N. Australia, New Zealand.

GENERAL HABITS. Very similar to the last. Solitary. Keeps to the rocky sea coast and squelchy tidal mud exposed at low water, or sits hunched up on a partially submerged rock or mangrove tree waiting for the ebb.

FOOD. Fish, especially the mudskipper (*Periophthalmus*), crabs, and occasionally insects, such as grasshoppers, obtained on bare ground above tide level.

VOICE. An occasional 'grunted croak or *ork* when feeding, presumably to signalize the acquisition of an unduly tasty morsel'. Also a longer harsher, *arrk* when alarmed (Gibson-Hill). Normally silent.

BREEDING. Colonial. *Season*, May to July and up to September. *Nest*, the usual rough untidy stick platform. Placed on rocks in hollows and crevices, in stunted *Ficus* trees, low thorny bushes up to a metre from the ground, or more commonly among mangrove trees in creeks, sometimes just above high-water mark (B. B. Osmaston). *Eggs*, 3 or 4, pale sea green, typical of the herons. Average size of 50 eggs 44.8×33.3 mm. (Baker).

MUSEUM DIAGNOSIS. For details of plumages, and a very full discussion of the colour phases etc., see A. O. Hume 1874, *Stray Feathers*, 2: 304-9.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	250-293	70-86	72-77	93-98 mm. (Baker)

COLOURS OF BARE PARTS. Variable. Iris yellow. Bill horny brown above, yellowish at base and on lower mandible; often yellow all over in white birds. Legs varying from pale yellowish green (in white birds) to deep dull greenish or nearly black (in dark individuals).

Genus NYCTICORAX T. Forster

Nycticorax T. Forster, 1817, Syn. Cat. Brit. Bds.: 59. Type, by tautonymy and monotypy, *Nycticorax infaustus* Forster = *Ardea nycticorax* Linnaeus

Bill very stout and deep, much compressed, with culmen distinctly curved; upper mandible notched close to tip. Head short and comparatively thick with nuchal crest of a few narrow feathers. Wings rounded: 3rd primary (as.) longest. Tail short, of 12 feathers. Only upper part of tibia feathered. Tarsus long and stout, about equal to culmen in length, scutellated in front, reticulated behind.

Genus practically cosmopolitan.

52. **Night Heron.** *Nycticorax nycticorax nycticorax* (Linnaeus)

Ardea Nycticorax Linnaeus, 1758, Syst. Nat., ed. 10, 1: 142 (Southern Europe)

Baker, FBI No. 2233, Vol. 6: 359

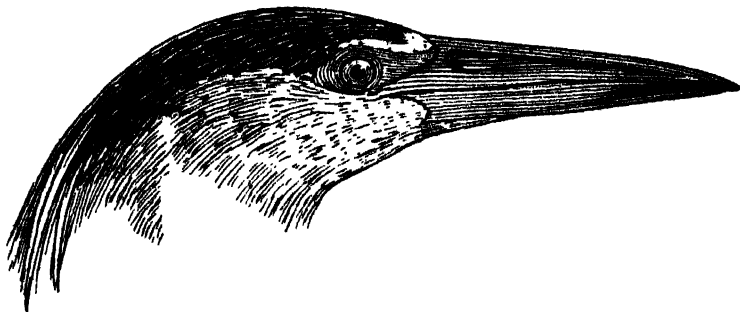
Plate 3, fig. 10, facing p. 48

LOCAL NAMES. *Waak*, *Kwaak*, *Tār bāglā*, *Kōkrāi* (Hindi); *Bōr* (Kashmir); *Bachka* (Bengal); *Chongkhu* (Manipur); *Raat bāggāl*, *Raat kokkū* (Marathi); *Awaak*, *Waak* (Gujarat); *Gadri* (Sind); *Chinta wākha* (Telugu); *Vūkka* (Tamil); *Toppi kokkū* (Malayalam); *Re kāna kokkū* (Sinhala).

SIZE. Pond Heron; length c. 58 cm. (23 in.).

FIELD CHARACTERS. A stocky grey, white and black marsh bird of the same general effect as the Pond Heron, with a markedly stouter bill.

Adult. *Above*, ashy grey with metallic greenish black back and scapulars. Forehead and a streak over eye white; crown, nape, and drooping occipital crest black, the last with a few long narrow white plumes. *Below*, white; sides of body ashy grey. Sexes alike.



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Young (immature). Brown, streaked and speckled with rufous, buff, and dark brown — rather similar looking, when at rest, to Pond Heron in non-breeding plumage.

STATUS, DISTRIBUTION and HABITAT. Resident. Patchily distributed, and shifting locally with water conditions. Throughout the subcontinent, up to c. 1900 m. in the Kashmir and Nepal valleys in spring and summer; most moving southward in winter. Ceylon, Andaman and Nicobar islands.

Not recorded from the Laccadives or Maldives. Affects jheels, tanks, streams, and ponds, as well as estuaries, tidal creeks, coastal lagoons and backwaters.

Extralimital. Central and southern Europe, south to Africa. Middle East, Burma, Thailand, Malaysia, the Indochinese countries to China and Japan.

GENERAL HABITS. Gregarious, crepuscular and nocturnal except in breeding season. Colonies from a dozen to several hundred birds spend the daytime roosting in the seclusion of dense *Pandanus*, mangrove or other bushes bordering or overhanging water, or covering a little islet in a river. A grove of large leafy trees or a bamboo copse on dry ground, maybe in the vicinity of a village—lofty chenars in Kashmir—do equally well. Here the birds sit sluggishly in their characteristic hunched posture, neck drawn into the body, shoulders and back rounded, and blood-red eye staring unblinkingly. Owing to their silent and secretive habits such daytime roosts, even large and populous ones, are liable to be overlooked unless some disturbance causes the birds to fly out, when they will mill around like a rabble of flying foxes before resettling. At dusk they bestir themselves, flying out singly or in small parties in different directions to their accustomed feeding grounds by some jheel or creek. Except when foraging for nest-young, feeding is chiefly done in the morning and evening twilight, and during the night. The birds are active in the quest for food and seldom still-hunt in the manner of true herons. The flight is strong and direct, with quick flaps of the rounded wings—reminiscent in the distance, and in silhouette, of a flying fox. The thick-set neck is pulled in and shortened, but not folded in an S as in the Grey Heron. At the communal roosts and heronries emotion of any kind between individual birds is expressed by a momentary raising of the crest and fluffing out of feathers of the neck, breast and back, followed occasionally by a jab of the bill at a neighbour.

VOICE and CALLS. A single unmistakable raucous *wock* or *kwaark* is uttered from time to time while flying to and from the feeding grounds. Partially fledged chicks in the nest or when out clambering among the adjacent branches keep up an incessant clamour, *click, click, click*, etc. for being fed.

FOOD. Fish, frogs, aquatic insects, dragonfly larvae, etc.

BREEDING. Colonial. Often in pure colonies of its own, or in segregated *mohallas* in mixed heronries, or even individually in uneasy proximity of nests of cormorants, egrets, and pond herons. *Season*, April-May in the Vale of Kashmir; June-July to September in N. India generally; December to February in S. India; December to September in Ceylon. *Nest*, a rough untidy platform of twigs, sometimes flimsy enough for the eggs to be seen from below. Placed in the same sort of sites as used for daytime roosts—trees, *Pandanus* or tamarisk bushes standing in or near water, or groves of trees (often lofty, as chenars in Kashmir) on dry land. *Eggs*, 3 or 4, rarely 5, typical of the family, pale blue green, longish ovals. Average size of 50 eggs 49.0×35.1 mm. (Baker). Both sexes take part in all the domestic chores. The nest material is evidently collected chiefly by the male. Incubation period not ascertained; given as 21 days for European birds. Great disparity in chicks of same brood owing to the eggs being laid at about 48-hour intervals and incubation commencing with the first egg. Chicks fed by

regurgitation, as in the family, the parent's bill being seized and violently pulled down into the nest to induce disgorgement. Courtship display described in Witherby 1939, 3: 148-9.

MUSEUM DIAGNOSIS. For details of plumages etc. see Witherby 1939, 3: 150-2.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	265-300	65-80	65-75	95-110 mm.
♀♀	270-285	66-75	—	—

(Witherby)

COLOURS OF BARE PARTS. Iris blood-red. Bill black, greenish yellow at base and on most of lower mandible. Naked lores and orbital skin yellowish green. Legs and feet dull green. In breeding season bill blacker; legs and feet lemon-yellow, orange-red, or pinkish red.

MISCELLANEOUS. Longevity (in captivity): 18+ years (PZS, 125: 535).

Genus GORSACHIUS Bonaparte

Gorsachius Bonaparte, 1855, *Consp. Av.*, 2: 138. Type, by monotypy, *Nycticorax goisagi* Temminck

Plumage variable. Bill as stout as in *Nycticorax* but much shorter. Culmen shorter than tarsus. Nostrils large, linear, open. Tarsus short, stout, reticulated throughout. Feet small, the toes bordered by a narrow membrane. Tail short, of twelve feathers. Head crested; neck short and thick. Wing rounded: 2nd, 3rd and 4th primaries (as.) subequal, the 3rd usually slightly the longest.

53. Malay or Tiger Bittern. *Gorsachius melanolophus melanolophus* (Raffles)

Ardea melanolopha Raffles, 1822, *Trans. Linn. Soc. London*, 13(2): 326
(Western Sumatra)

Baker, *FBI No.* 2234, Vol. 6: 361

Plate 7, fig. 1, facing p. 144

LOCAL NAMES. *Rāj bōg* (Assam); *Thāvittu kokku* (Malayalam); *Re kokka* (Sinhala).

SIZE. Pond Heron +; length c. 51 cm. (20 in.).

FIELD CHARACTERS. An unmistakable relation of the Pond and Night Herons. Reminiscent also of a large Chestnut Bittern (q.v.).

Adult. *Above*, crown and long bushy nuchal crest ashy black. Back and rest of upperparts largely chestnut-cinnamon, closely and finely barred with black (hence sometimes called Tiger Bittern). Primaries and secondaries greyish black with chestnut and white tips. Tail black, rufescent at tip. *Below*, chin and throat white; foreneck and upper breast sandy-rufous streaked with black. Rest of underparts white, blotched and spotted with black and rufous on lower breast and abdomen. Sexes alike.

Young (immature). *Above*, head almost black; nape and long crest feathers streaked with white. Rest of upper plumage dark brown spotted with white, the wings and scapulars with wavy buff barring. *Below*, chin and throat white with a central dark brown streak. Rest of underparts white to buff, spotted and barred with dark brown, densely on breast lightly on abdomen and flanks.

STATUS, DISTRIBUTION and HABITAT. One of the peculiar discontinuously distributed Indo-Malayan species of evergreen biotope. Resident in the heavy rainfall areas of the southern Western Ghats — Kerala, W. Mysore (including Nilgiris) north to about Belgaum (c. $15^{\circ} 50' \text{ N.} \times 74^{\circ} 31' \text{ E.}$); Assam, Manipur. Winter visitor to Ceylon. Foothills and up to at least 800 m. altitude in SW. India; up to c. 1800 m. in Ceylon. Frequents streams and marshy patches in thick forest.



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Extralimital. Burma, Thailand, Malaysia, Indochina, S. China, Formosa, Borneo, Sumatra, Java.

MIGRATION. Very little known. Regular winter visitor to Ceylon arriving on the west coast in October and November. At Jatinga in the Haflong district (c. $25^{\circ} \text{ N.} \times 93^{\circ} \text{ E.}$) and in certain other valleys of Assam, birds of this species, along with several others usually considered non-migratory, are regularly attracted in large numbers to lights displayed by the villagers. Jatinga lies on a spur flanking the valley at an altitude of about 600 m., and the appearance of the birds on dark cloudy overcast monsoon nights between August and October, flying in a north-south direction, is clearly suggestive of some sort of migratory passage. Further investigation is desirable. (For a fuller account see Sálím Ali, 1962, JBNHS 59 (1): 128-30.)

GENERAL HABITS. In many respects similar to those of the Night Heron; largely nocturnal. Excessively shy and difficult to approach or observe, but perhaps less rare than generally believed. When disturbed feeding at a water-hole in dense forest, it flies off noiselessly with a rapid flapping of wings, alighting a short distance away in a thick tree, whence it moves on again before it can be approached.

VOICE and CALLS. On the whole very silent. Besides a short croak and hisses uttered by an incubating bird when closely approached, nothing recorded. When hungry, captive birds uttered 'a rasping *arh arh arh* (a as in "hat")' — G. M. Henry.

FOOD. Fish, frogs, lizards, molluscs, insects, etc.

BREEDING. *Season*, in Assam chiefly May and June; in SW. India end May to August, during the heaviest rains. *Nest*, a flimsy structure of twigs like the Pond Heron's, sometimes with a lining of reeds etc. Usually placed between 5 and 8 m. up in a small tree overhanging a stream in thick forest. Not concealed, but easily overlooked. Rarely in reed beds. *Eggs*, 3 to 5, white

with a bluish tinge; broad ovals occasionally slightly pointed at the small end. Average of 40 eggs 46.2×37.2 mm. (Baker). Though ordinarily so shy, the bird is a close sitter, hissing and croaking at the intruder and refusing to leave its nest till almost touched. Share of the sexes in nest building, incubation and feeding the young unrecorded. Period of incubation unknown.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	255-281	43-49	c. 67-79	96-112 mm. (Baker)

COLOURS OF BARE PARTS. Iris golden yellow. Bill fleshy yellow, the culmen and tip horny brown. Orbital skin greenish slate, suffused with red in the breeding season. Legs and feet dull green, brownish in front.

54. **Nicobar Tiger Bittern.** *Gorsachius melanolophus minor* Hachisuka

Gorsachius melanolophus minor Hachisuka, 1926, Ibis: 592

(Katchel Island, Nicobar Is.)

Baker, FBI No. 2235, Vol. 6: 363

LOCAL NAMES. Unrecorded.

SIZE. Slightly smaller than the foregoing.

FIELD CHARACTERS. As in No. 53.

STATUS, DISTRIBUTION and HABITAT. Apparently resident, but rare. Nicobar Islands (obtained at Katchel, Tillangchong, False Harbour, etc.). Frequent streams and swampy patches in thick forest.

GENERAL HABITS. As described under No. 53.

BREEDING. Not recorded.

MUSEUM DIAGNOSIS. As No. 53, but smaller. Plumage very variable.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	224-234	40-42 (once 44)	c. 61-67	80-88 mm. (Baker)

COLOURS OF BARE PARTS. As in the nominate race (No. 53).

Genus *IXOBRYCHUS* Billberg

Ixobrychus Billberg, 1828, Syn. Faun. Scand., 1(2): 166. Type, by subsequent designation, *Ardea minuta* Linnaeus. (Stone, 1907, *Auk*, 24: 192.)

Bill straight and slender; culmen flat at base with a broad shallow groove on each side of upper mandible. Tarsus rather short, equal to about two-thirds of the culmen. Back of neck almost denuded of feathers, though this concealed by feathers of side of neck. Head crested. Feathers of upper breast very soft and lax; no dorsal or scapular plumes. Tail short, often of ten feathers only.

Genus almost cosmopolitan except in the northern Holarctic Region.

55. **Little Bittern.** *Ixobrychus minutus minutus* (Linnaeus)*Ardea minuta* Linnaeus, 1766, Syst. Nat., ed. 12, 1:240 (Switzerland)

Baker, FBI No. 2236, Vol. 6:364

Plate 5, fig. 10, facing p. 96

LOCAL NAME. *Goi* (Kashmir).SIZE. Pond Heron —; length *c.* 36 cm. (14 in.).

FIELD CHARACTERS. A 'hunchbacked' waterside bird, similar in general effect to the Pond Heron. In flight whitish shoulder patch contrasting with blackish wings, suggestive of identity.

Male (adult). *Above*, black, including crown, nape, crest, back, scapulars, rump, tail, and innermost secondaries. A large lavender-grey to whitish patch on closed wing (coverts) almost masking the blackish brown flight feathers while bird at rest. Sides of head and neck greyish pink or vinous. *Below*, throat and neck white to buff. Upper breast ochre, of lanceolate feathers; lower breast blackish maroon. Rest of underparts white, the flanks ochre with faint dark shaft-lines.Female. *Above*, chestnut-brown largely replacing black. A chestnut-brown shoulder patch. *Below*, chiefly chestnut and rufous, streaked with rufous-buff.Young (immature). *Above*, dark brown with rufous scalloping or streaking. *Below*, chiefly white and buff, streaked with chestnut and buff.STATUS, DISTRIBUTION AND HABITAT. Resident: local, and apparently also locally migratory. West Pakistan (Sind), and northern India (Nepal, Uttar Pradesh), east to Assam (Cachar — Baker). Normally in the lowlands; in the vale of Kashmir up to *c.* 1500 to 1800 m. altitude. Frequents jheels and marshes with thick reed-beds and other cover.*Extralimital.* Central and southern Europe to W. Siberia and Transcaspia. Asia Minor, Israel, Iran, Turkestan, Afghanistan. N. Africa, wintering south to Cape Colony. Other races in tropical Africa, Australia, New Zealand.

GENERAL HABITS. Non-gregarious; usually keeping singly, rarely two or three together. Largely crepuscular. Skulks in thick reed-beds during daytime, clambering amongst the stems, and seldom shows itself except when flushed from its retreat. Flies with fairly rapid flaps of the rounded wings, head characteristically drawn into the shoulders, close above the water or reed tops to pitch into the growth again a short distance away preceded by a short glide. Sometimes seen standing hunchbacked at the edge of a reed-bed, lunging out with its bill now and again at some insect or other morsel. When suddenly come upon, especially when on nest, the bird 'freezes', stretching the flexible neck to its full length upwards, bill thrust stiffly into the sky. In this attitude the long slender neck blends so perfectly with the surrounding reeds, particularly in the case of the streaked female, that the bird becomes astonishingly invisible even at close range as long as it remains still.

VOICE AND CALLS. An occasional frog-like *wūk* is recorded in Kashmir. In Europe the male has been described as uttering 'a rather low croaking *hōgh* repeated often for long stretches with remarkable regularity at rate of approximately 25 to a minute' (A. Voigt in Witherby 1939).

FOOD. Fish, frogs, molluscs, crustaceans, and largely insects.

BREEDING. Has been recorded in the Eastern Nara district of Sind (Doig and Butler) in May; in Kohat (Whitehead) in July; in Cachar (Baker — once) month not stated. Breeds commonly and abundantly in the Kashmir Valley from May to July; singly, not in colonies. *Nest*, a pad of rushes built partly by bending down a number of reeds and then adding other pieces of reed flags to form a shallow platform; from a few centimetres to a metre or so above the water. Normally in dense reed-beds and liable to be swamped by rise of water level in a flood. Sometimes the nests are made of fine twigs and provided with a depression for the eggs. *Eggs*, 4 to 6 or 7, white, often with a pale bluish tinge; regular ovals about equal at both ends, smooth but glossless. Average size of 80 eggs 34.1×26.0 mm. (Baker). Both sexes share in building the nest, incubation, and feeding the young. The eggs are laid at two-day intervals. Incubation period 16–17 days. Incubation commences with the first egg, resulting in marked disparity in the development of chicks of the same brood. The nestling is clothed in loose cinnamon-coloured down with longer bottlebrush-like bristles sticking out from its crown. The older chicks clamber about among the surrounding reeds till a parent returns with food, whereupon they scramble back to the nest where the characteristic tussle ensues to induce it to regurgitate.

MUSEUM DIAGNOSIS. For details of plumages etc. see Witherby 1939, 3: 154–5.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♂	142–155	45–52	42–47	45–52 mm.
♀ ♀	137–150	45–52		
	(once 157)			

(Witherby)

COLOURS OF BARE PARTS. Iris pale yellow to orange-yellow. Bill yellow, creamy yellow or purplish yellow, the culmen darker and browner. Orbital skin pale livid green. Legs and feet greenish yellow, dull greenish plumbeous or greenish horny (Baker).

56. Chestnut Bittern. *Ixobrychus cinnamomeus* (Gmelin)

Ardea cinnamomea Gmelin, 1789, Syst. Nat., 1(2): 643 (China)

Baker, FBI No. 2238, Vol. 6: 367

Plate 3, fig. 9, facing p. 48

LOCAL NAMES. *Lāl bāglā* (Hindi); *Khyri bāk* or *Lāl bāk* (Bengal); *Meti kokka* (Sinhala); *Kūrūttu kokku* (Tamil); *Sāndhya kokku* (Malayalam).

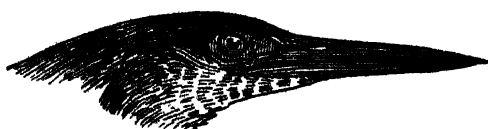
SIZE. Pond Heron —; length c. 38 cm. (15 in.).

FIELD CHARACTERS. Smaller and lankier than Pond Heron, but an unmistakable cousin.

Male (adult). *Above*, including crown and bushy crest, chestnut-cinnamon. Wing quills chestnut. *Below*, chin and throat whitish with a dark median stripe down foreneck. A patch of black and chestnut buff-edged feathers on each side of upper breast largely concealed by the elongated

breast feathers; rest of underparts pale chestnut. Underside of wings (in flight) still paler chestnut with a pinkish tinge.

Female (adult). *Above*, chestnut-brown. Crown blackish. Scapulars and wing-coverts with black-bordered buff spots. *Below*, buffy rufous with a heavy brown streak down middle of foreneck and breast, flanked by parallel broken lines on either side, like 'coarse stitching with brown thread'. Rest of underparts streaked with dark brown. Underwing rufous-buff.



× c. $\frac{1}{2}$

Young (immature). Like female but less chestnut more brown above, and more distinctly barred and spotted. *Below*, more heavily streaked with dark brown.

STATUS, DISTRIBUTION and HABITAT. Resident — subject to local movements dependent on water conditions; possibly also migratory to some extent. Throughout the subcontinent, Ceylon, Andaman, Nicobar and Maldive islands. The Indus Valley is approximately the western limit of distribution of both this and Yellow Bittern; eastward to Assam and beyond. Lowlands from the Nepal duns and Himalayan terai southward in the Peninsula and Ceylon. Up to at least 900 m. elevation in the peninsular hills; to over 1800 m. in Ceylon. Affects reed-beds in inland jheels and swamps, inundated standing paddyfields, etc. Rarely also coastal backwaters and tidal mangroves, e.g. in Kerala; frequently side by side with the Yellow Bittern.

Extralimital. Burma, Thailand, Malaysia, Philippines, Sunda Islands, Celebes (Sulawesi). China from Manchuria to Hainan; Ryukyu Islands.

GENERAL HABITS. Non-gregarious and largely crepuscular. Normally seen during daytime only when flushed out of long grass, as when snipe-shooting, but commonly flying about from one reed patch to another during the breeding season and in overcast rainy weather. Flight (rather quick flaps of the rounded wings with neck drawn in) and other habits and behaviour very like Pond Heron and Yellow Bittern.

FOOD. Fish, frogs, molluscs, insects, etc. in astonishing quantity. One bird had swallowed a fish 12.70 cm. long, c. 5 cm. in circumference, with a skull c. 2 cm. across, 1 eel c. 13 cm. long, and 2 of c. 9 cm. each (Butler — Andamans).

VOICE and CALLS. Normally silent. Very noisy in spring, constantly uttering a loud *kok-kok* (La Touche). In courtship 'the male flew slowly before the female with slow, stiff wing beats, calling *ek-ek-ek*, then perched at the top of a low tree and sang *gook-gook-gook-gook-gook-gook-gook-gook* with each of the first five notes louder than the one before it, and the last three pitched three or four tones lower' (H. G. Deignan). J. K. Stanford also describes this display in identical terms, minus the accompanying calls, and

says it reminded him of the nuptial flight of a longeared owl or a greenfinch (*vide* Smythies).

BREEDING. *Season*, between June and September, commencing as soon as the monsoon rains have well set in; most general in July-August. *Nest*, a small pad of leaves, bits of reed stem, etc. built on bent-down matted reeds, or in a cane brake in a swamp, a metre or so above the water or mud. *Eggs*, 4 or 5, sometimes 6, white with occasionally a bluish tint; short to long ovals, generally almost cylindrical. Average size of 50 eggs 36.5×26.4 mm. (Baker). Both sexes take part in building the nest, incubation, and feeding the young, which is done by regurgitation, as described under No. 36. Period of incubation undetermined.

MUSEUM DIAGNOSIS. Tibia naked for c. 10 mm. above tibio-tarsal joint; otherwise as for the genus (cf. *I. minutus*).

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	138-149 (once 156)	43-51	45-50	41-45 mm. (Baker)
Recent specimens from Nepal measure:				
	Wing	Bill (from posterior edge of nostril)		Tail
3 ♂ ♂	151, 152, 154	45, 46, 47		44, 46, 48 mm.
1 ♀	145	45		45 mm. (Biswas)

COLOURS OF BARE PARTS. Iris yellow, orange, or pinky red. Bill greenish yellow or light orange-yellow, the culmen blackish, and base of the mandibles rosy red. Naked orbital and loreal skin deep rosy red or reddish purple in male; yellowish in female. Legs and feet yellowish green; soles paler, more yellow.

57. Yellow Bittern. *Ixobrychus sinensis* (Gmelin)

Ardea Sinensis Gmelin, 1789, Syst. Nat. 1(2): 642 (China)

Baker, FBI No. 2237, Vol. 6: 365

Plate 5, fig. 9, facing p. 96

LOCAL NAMES. *Jūn bāglā* (Hindi); *Kat bāk* (Bengal); *Meti kokka* (Sinhala); *Mānāl nārđi* (Tamil); *Manja kokku* (Malayalam).

SIZE. Same as Chestnut Bittern; length c. 38 cm. (15 in.).

FIELD CHARACTERS. Like the Chestnut Bittern, small and lanky, and an unmistakable cousin of the Pond Heron; predominantly yellow, brown, rufous, and chestnut. In flight yellowish fawn body contrasting with black wings suggestive of identity.

Male (adult). *Above*, crown and bushy crest black; sides of head vinous-pink. Back chiefly light brown or yellowish brown. Rump dark ashy; tail slaty black. Wing quills blackish. *Below*, chin, throat, and foreneck pale yellowish; upper breast blackish with buff streaks; rest of underparts pale yellowish buff.

Female. More or less similar except for a buff mesial line down the throat and foreneck, sometimes obsolescent.

Young (immature). *Above*, rufous-brown with broad buff fringes to the feathers (scalloping). *Below*, more heavily streaked; buff mesial line down centre of foreneck more pronounced.

STATUS, DISTRIBUTION and HABITAT. Resident, moving locally with water conditions; possibly also migratory to some extent. Throughout the subcontinent from the Indus Valley eastward to Assam and beyond, and from Nepal (duns) southward to Kerala. Also Ceylon, Andamans, and Nicobars. Lowlands, and up to c. 900 m. in the peninsular hills; to c. 1200 m. elevation in Ceylon. Affects reed-beds, and scrubby growth in inland swamps as well as coastal mangroves and backwaters, and inundated standing paddy crops, etc., frequently side by side with Chestnut Bittern.

Extralimital. Burma, Thailand, Malaya east to China and Japan, south to New Guinea and the Caroline Is. The numerous subspecies described are ill defined and their validity, according to Hartert (1910-22, 2: 1260) and later authorities, is questionable.

GENERAL HABITS. Like the Little Bittern (q.v.) largely crepuscular and nocturnal, but quite active in daytime in cloudy, overcast weather. When come upon suddenly, especially on nest, it also assumes the characteristic posture of the tribe aptly termed 'On Guard'. The slender neck is thrust vertically upward, bill pointing to the sky, while the bird freezes, taking full advantage of its streaked underside to become astonishingly inconspicuous amongst the reedy surroundings. In other respects also very similar to both the Little and the Chestnut Bitterns.

FOOD. Fish, frogs, molluscs, insects, etc. One described sitting on its heels catching flies 'which it did with incredibly rapid lunges of its head and bill without moving its body at all' (Vaughan & Jones — E. China).

VOICE and CALLS. Very silent. *Kaka-kakak* (Mayr — SW. Pacific).

BREEDING. *Season*, as in Chestnut Bittern, between June and September, as soon as the monsoon has properly set in, filling the depressions and swamps. *Nest*, and site, not different from the last — a pad of reed flags etc. placed on bent-down reeds in a swamp, or in shrubbery on the edge of a pond, from a few centimetres to a metre or so above the water or mud. *Eggs*, 4 to 6, fine-textured but glossless, pale skim-milk blue or green-blue. Inner membrane pale blue *contra* white or pale yellowish white in *Ixobrychus minutus*. Average size of 60 eggs 31.2×23.9 mm. (Baker). Both sexes take part in all the domestic chores. The eggs are laid on consecutive days and incubation begins from the first egg. Period of incubation undetermined.

MUSEUM DIAGNOSIS. For fuller description of plumage see Baker, loc. cit.

Tibia feathered down to the tibio-tarsal joint. Culmen longer than mid-toe and claw. Rest as for the genus.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	129-136 (once 143)	52-57 (once 49)	44-51	41-47 mm. (Baker)

COLOURS OF BARE PARTS. Iris orange-yellow or bright golden yellow. Bill: culmen horny brown, commissure and lower mandible pale yellowish flesh; mouth

pink. Naked facial skin pale greenish yellow. Legs and feet yellow or greenish yellow; claws horny brown.

Genus *DUPETOR* Heine & Reichenow

Dupetor Heine and Reichenow, 1890, Nomencl. Mus. Hein. : 308.

Type, by monotypy, *Ardea flavicollis* Latham

Differs from *Ixobrychus* in having a longer bill, this exceeding the middle toe and claw. Tarsus shorter than bill. Back of neck partially naked, less completely so than in *Ixobrychus*.

Genus confined to the Oriental and Australian regions.

58. **Black Bittern.** *Dupetor flavicollis flavicollis* (Latham)

Ardea flavicollis Latham, 1790, Index Orn., 2: 701 (India)

Baker, FBI No. 2239, Vol. 6: 368

Plate 3, fig. 8, facing p. 48 and Plate 7, fig. 2, facing p. 144

LOCAL NAMES. *Kālā bāglā* (Hindi); *Kālo bāk* (Bengal); *Ay jan* (Assam); *Khaira bōg* (Assam, Nowgong); *Kalu kōkka* (Sinhala); *Kāruppu nārāi* (Tamil); *Kārūtha kōkku* (Malayalam).

SIZE. Pond Heron +; length *c.* 58 cm. (23 in.).

FIELD CHARACTERS. General effect as of Pond Heron; largely black and rufous-buff with a conspicuous buff-and-white check patch.

Male (adult). *Above*, crown, sides of head, and upperparts including wings and tail, slaty grey to almost black. A band of bright ochre-yellow on either side of neck. *Below*, chin and throat white with a rufous dotted line down the middle. Foreneck mixed slaty black, chestnut, and buff. Upper breast dark slate with buffy white margins to the feathers (scalloping). Rest of underparts slaty grey to brownish black with a few white-edged feathers on abdomen.

Female (adult). *Above*, more brown less slaty grey. *Below*, breast feathers streaked with white and rufous markings. Abdomen lighter brown with more white in centre.

Young (immature). *Above*, crown slaty black; rest of upper plumage including wings, dark brown scalloped light rufous. *Below*, upper breast brownish rufous, scalloped paler and with darker shaft-streaks.

STATUS, DISTRIBUTION and HABITAT. Resident, shifting locally with water conditions. Thinly and patchily distributed throughout the better watered parts of the subcontinent, from Sind in West Pakistan (E. Nara district) and the Gangetic Plain including Bengal and East Pakistan, to Assam, Manipur and beyond. Fairly common in the heavy rainfall zone of south-west India (Mysore, Kerala), and Ceylon. Not recorded from the Andaman and Nicobar islands. Affects reedy inland swamps and overgrown seepage nullahs in jungle, mostly in the low country, but also suitable marshes up to *c.* 1200 metres in the hills. Apparently not found in tidal mangroves.

Extralimital. Burma, Thailand, Malaysia, Indochina, central and southern China, Greater Sunda Is., Celebes (Sulawesi). Other races extend the species to Australia.

GENERAL HABITS. Non-gregarious; largely crepuscular and nocturnal. On the whole very similar to those of the genus *Ixobrychus*. Skulks in swampy reed-beds and thickets once the sun is up, and only seen in daytime when beaten out of its retreat; more active at dawn and dusk, and in overcast rainy weather. Flight characteristic of the little herons as described. When suddenly come upon, adults as well as flightless clambering young assume the 'On Guard' posture and freeze, effectively camouflaging themselves among the reed stems.

FOOD. Fish, frogs, molluscs, insects, etc. (One fish *c.* 115 cm. taken from stomach.)

VOICE and CALLS. Unrecorded, except for a loud booming in the breeding season.

BREEDING. *Season*, mainly June to September during the SW. monsoon, varying locally with incidence of rainfall and filling up of jheels and swamps. *Nest*, a pad of twigs or matted water-weeds with a slight central depression. Placed on bent-down reeds in a swamp, or in a cane brake or bamboo clump, a metre or so above the surface. *Eggs*, normally 4, broad ovals more or less equal at both ends, white with a faint tinge of bluish or sea green. Average size of 40 eggs 41.6×31.4 mm. (Baker). Both sexes share all the domestic chores. Incubation starts with the first egg. Incubation period undetermined. Chicks fed by regurgitation as characteristic of the family.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	197-215	69-82	61-70	63-74 mm.
♀♀	196-204			

COLOURS OF BARE PARTS. Iris golden brown to red. Bill reddish horny, paler and yellowish at tip and terminal half of lower mandible; bare facial skin purple, the eyelids bluer. Legs and feet dark brown (Baker).

Genus *BOTAURUS* Stephens

Botaurus Stephens, 1819, in Shaw, Gen. Zool. 11(2): 592. Type, by subsequent designation, *Ardea stellaris* Linnaeus

Plumage long and lax forming decorative plumes down foreneck and breast. Bill, short, deep at base, much compressed. Culmen shorter than tarsus. Nasal groove broad and deep with the linear nostril near base. Tarsus stout and short, shorter than middle toe and claw. Tibia partly naked above joint. Tail of ten feathers.

Genus confined to Oriental and Australian regions, one species being found in India.

59. **Bittern.** *Botaurus stellaris stellaris* (Linnaeus)

Ardea stellaris Linnaeus, 1758, Syst. Nat., ed. 10, 1: 144
(Europe, restricted to Sweden)

Baker, FBI No. 2240, Vol. 6: 370

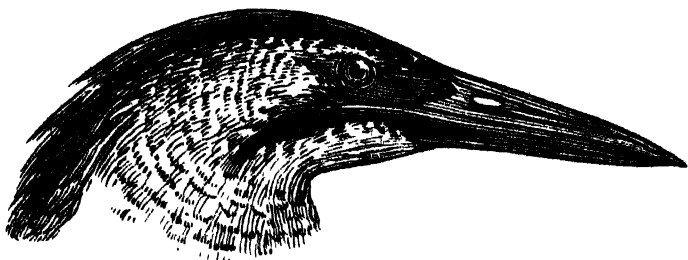
Plate 5, fig. 4, facing p. 96

LOCAL NAMES. *Nir goug*, *Bāz* (Hindi).

SIZE. Pond Heron +; length c. 71 cm. (28 in.).

FIELD CHARACTERS. Considerably larger than the Pond Heron, but of the same general hunchbacked effect, with neck retracted, both at rest and in flight. Overall tawny buff or straw colour, closely barred and mottled with blackish. Short, stout, pointed bill, and large feet.

Adult. *Above*, crown, nape and upper back black; bushy drooping crest partly tipped and edged with buff. Sides of head ochre, faintly stippled with black. Lower back, rump, and tail yellowish buff, profusely barred and mottled with black. *Below*, chin and throat white with a conspicuous buff and black median line continued down elongated overhanging yellowish buff breast plumes. Rest of underparts yellowish buff, streaked with brown and buff. Sides of breast narrowly barred with brown and dark buff. Sexes alike.



× c. $\frac{1}{2}$

STATUS, DISTRIBUTION and HABITAT. Winter visitor, found in small numbers from Sind in West Pakistan (common) across Rajasthan and the Gangetic Plain to Assam, straggling south through Gujarat, Madhya Pradesh, Orissa, Andhra Pradesh, Maharashtra, Madras and Mysore (Nanjangud, 160 km. south of Bangalore, being the southernmost record in India). Not recorded in Kerala or Ceylon. Affects dense reed-beds and bulrushes in inland jheels and swamps.

Extralimital. Breeds in the temperate Palaearctic region throughout Europe and Asia from Great Britain to Japan. A second breeding race in South Africa.

MIGRATION. No precise information.

GENERAL HABITS. Similar to its smaller cousins described. Solitary, secretive, crepuscular and nocturnal. Seldom seen in daytime except when put up from partly submerged reed-beds, e.g. while snipe-shooting is in progress. Flaps leisurely and noiselessly above the reeds on its broad rounded wings and pitches into cover again a short distance away. When nesting, has the characteristic habit of freezing on alarm, neck and bill stretched vertically upward. In its winter quarters this 'On Guard' posture is only seen when e.g. a wounded bird is trying to evade capture.

FOOD. Fish, frogs, molluscs, insects, etc. Elsewhere small birds and rodents also recorded.

VOICE and CALLS. Silent in winter. In breeding season the male utters a deep, resonant, rather ventriloquial *boom*, commonly repeated 3 to 6 times

or more. It is not particularly loud but of great carrying power and audible over a mile away.

BREEDING. Not proven but may possibly breed in thick reed-beds in Anchar Lake in the Kashmir Valley as asserted by local shikaris. According to Bates & Lowther 1952 (p. 355) it may occasionally be heard *booming* there in June, which is suggestive circumstantial evidence. *Nest* and site similar to those of the smaller bitterns. *Eggs*, 4 to 6, light olive-brown with a few specks and spots of darker brown at the broad end. Average size of 80 eggs 52.5×38.3 (Baker).

MUSEUM DIAGNOSIS. For description of plumages etc. see Witherby 1939, 3: 159-60.

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂♂	320-350	60-75	90-100	95-116 mm.
♀♀	300-350	65-75	—	—

(Witherby)

COLOURS OF BARE PARTS. Iris yellow. Bill greenish yellow, ridge of upper mandible brown at base, black-brown at tip. Lores and round eyes green to 'livid blue'. Legs and feet pale green, yellowish at tarsal joint and back of tarsus; soles yellow (Witherby).

MISCELLANEOUS. Longevity (from ringing data) 8+ years (*Ring*, 1962, 33: 148).

Family CICONIIDAE. Storks

Large, long-legged, diurnal birds chiefly terrestrial and marsh-haunting. Colour pattern mainly white and black with a metallic sheen. Bill long, massive, pointed, straight or nearly so, ungrooved. Wings long and broad. Tail short; under tail-coverts lax and greatly developed in some species. Legs very long, the tibiae partly naked. Toes of moderate length, webbed at base. Claws blunt, that of middle toe not pectinated as in herons. No powder-down 'shampoo' patches. Tracheo-bronchial muscles to the syrinx or 'sound box' absent, therefore lacking voice and calls. Most species produce low grunting and hissing noises, and a loud castanet-like clattering or snapping of the mandibles.

Unlike herons, storks fly with neck and legs fully outstretched like cranes, ibises and spoonbills, by a series of wing flaps interspersed with sailing.

RANGE. Temperate and tropical zones of the Old and New Worlds. Seventeen species in all, the northern ones migratory.

FOOD. Mainly small animals — mammals, birds, reptiles, amphibians, fish, crustaceans, insects, etc.

BREEDING. *Nests*, large stick platforms in trees, or on cliffs and buildings. *Eggs*, 3-6 white. Incubation and nest feeding by both sexes. Chicks nidicolous; naked at first, downy later. Food regurgitated by parent into nest, whence guzzled by nestlings.

For structural and morphological details see Baker 1929, 6: 320; Witherby *et al.* 1939, 3: 112; Stresemann 1927-34, *Aves*: 807-9.

Key to the Indian forms

Page

A Mandibles with edges not touching, leaving open gap near centre of bill	1
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1	Primaries, secondaries, scapulars, and tail black, rest of plumage white.....	<i>Anastomus oscitans</i> (breeding)	95
	Primaries, secondaries, scapulars, and tail black, rest of plumage grey.....	<i>Anastomus oscitans</i> (non-breeding)	95
B	Mandibles touching		2
2	Bill straight, head and neck unfeathered, prominent gular pouch, wing over 75 cm. (c. 30 in.).....	a	
	Bill straight, head and neck unfeathered, gular pouch absent, wing under 70 cm. (c. 28 in.).....	b	
	Bill straight, head and neck generally feathered.....	c	
	Bill slightly upcurved at end, head feathered.....	d	
	Bill downcurved, head naked.....	e	
a	Upperparts, including wings, slaty grey. Silvery grey stripe across wings	<i>Leptoptilos dubius</i> (breeding)	105
	Silvery grey stripe absent.....	<i>Leptoptilos dubius</i> (non-breeding)	105
	Upperparts blackish brown.....	<i>Leptoptilos dubius</i> (juvenal)	105
b	Upperparts glossy black, copper spots on secondary coverts.....	<i>Leptoptilos javanicus</i> (breeding)	107
	Copper spots lacking.....	<i>Leptoptilos javanicus</i> (non-breeding)	107
	Plumage dull black above, head and neck with patches of feathers	<i>Leptoptilos javanicus</i> (juvenal)	107
c	Plumage white, scapulars and wing quills black.....		
	<i>Ciconia ciconia</i> (adult)	99, 102
	Black of wings replaced with brown.....	<i>Ciconia ciconia</i> (juvenal)	99, 102
	Neck white, back and wings glossy black.....		
	<i>Ciconia episcopus</i> (adult)	98
	Glossy black replaced by dull, dark brown.....		
	<i>Ciconia episcopus</i> (juvenal)	98
d	Plumage black with white underparts (standing c. 106 cm. = 3½ ft.).....	<i>Ciconia nigra</i> (adult)	102
	Neck brown, back dull blackish brown, underparts white.....		
	<i>Ciconia nigra</i> (juvenal)	102
	Head, neck, and scapulars iridescent black, remainder of plumage white (standing c. 135 cm. = 4½ ft.)		
	<i>Xenorhynchus asiaticus</i> (adult)	104
	Black of head, neck, and scapulars replaced by dusky brown....		
	<i>Xenorhynchus asiaticus</i> (juvenal)	104
e	Neck white	<i>Ibis leucocephalus</i> (adult)	93
	Neck brown	<i>Ibis leucocephalus</i> (juvenal)	93

Genus IBIS Lacépède

Ibis Lacépède, 1799, Tabl. Ois.: 18. Type, by tautonymy, *Ibis candidus* Daudin =
Tantalus ibis Linnaeus

Bill long, and very slightly compressed, broad at the base. Culmen rounded throughout; slightly turned downwards throughout its length; lower mandible concave beneath. Both mandibles subcylindrical anteriorly. Nostrils oval, placed near base of culmen. Head and throat naked; nape and neck feathered. Legs long with tibia half naked; toes long. Under tail-coverts very long, extending beyond tail. Represented in our area by only one species.

60. **Painted Stork.** *Ibis leucocephalus* (Pennant)*Tantalus leucocephalus* Pennant, 1769, Indian Zool.: 11, pl. 10 (Ceylon)

Baker, FBI No. 2214, Vol. 6: 331

Plate 2, fig. 4, facing p. 32

LOCAL NAMES. *Jānghil*, *Dhōk* (Hindi); *Kānkāri* (Mirshikars, Bihar); *Jānghil*, *Rām jhāṅkar*, *Sona jāṅgha* (Bengal); *Lamjang*, *Lungduk* (Sind); *Chitrōda* (Kutch); *Yeru kālā kongu* (Telugu); *Chēṅgā nārāi* (Tamil); *Sāṅguwālai nārāi* (Tamil, Ceylon); *Das tuduwa* (Sinhala).

SIZE. Vulture \pm ; standing c. 93 cm. ($3\frac{1}{2}$ ft.).

FIELD CHARACTERS. A long-legged, long-necked, egret-like marsh bird with long, heavy yellow bill slightly decurved at tip, and unfeathered waxy yellow face. Plumage white, closely barred with metallic greenish black above, with a black band across breast. Delicate rose-pink near the tail (closed inner secondaries). Wing- and tail-quills black. Sexes alike.

Flight silhouette somewhat hunchbacked, neck outstretched (head lower than line of back) and long legs trailing straight behind.

Young (immature). Pale brown with dark scale-like edges to the neck feathers. No pectoral band.

STATUS, DISTRIBUTION and HABITAT. Resident, shifting locally with water conditions. Throughout the plains of the Indian Union, both Pakistans, Nepal terai, Ceylon (low country dry zone). Not recorded in the Andaman Is. Affects inland marshes, jheels, inundated fields, and occasionally river banks.

Extralimital. Burma, Thailand, N. Malaya (vagrant), Indochina, SW. China.

GENERAL HABITS. Normally met with in pairs or small parties. In the breeding season enormous congregations of up to several thousand strong may collect at favourite heronries, e.g. Keoladeo Ghana in Rajasthan. Such heronries tend to become traditional if left unmolested. The birds feed gregariously where food is abundant, such as when large quantities of fish are washed down by monsoon floods. Usually they hunt individually, wading into shallow water with neck bent down, mandibles open like an enormous pair of forceps and partly immersed, probing the bottom mud. The bird saunters about slowly ploughing the water thus. From time to time one leg is partly flexed and deliberately waggled back and forth in a raking motion, occasionally supplemented by a sudden flicking open of the wing on the same side. This manoeuvre is obviously intended for stampeding 'frozen' quarry towards the open mandibles. Its success is evident from the snapping and swallowing action that frequently follows. When sated, the birds spend their time standing about hunchbacked on the bank, or soaring on thermals for hours on end, circling aloft on motionless wings in company with pelicans and other stork-like birds. Normal flight typical of the family (q.v.), accompanied by a rhythmical slight opening and closing of bill as if gasping for breath.

FOOD. Mainly fish. Also reptiles, frogs, crustaceans, and insects.

VOICE and CALLS. Silent except for the characteristic clattering of the mandibles of the family. During greeting ceremony at nest a low moan

produced by both (?) sexes. A continuous harsh grating or scraping noise by half-grown nestlings when begging food.

BREEDING. Colonial, sometimes several thousand pairs together in mixed heronries. *Season*, variable, dependent on monsoon conditions. Normally August to October in N. India; November to March in the south; March-April in Ceylon. In drought years breeding may be skipped altogether. *Nest*, a large stick platform with a shallow central depression sparsely lined with leaves, straw, and waterweeds; added to desultorily throughout occupation with leafy twigs or green water vines (e.g. *Ipomoea*). Built in large or medium sized trees standing in water, such as babool (*Acacia arabica*), kändi (*Prosopis spicigera*), kelikädämb (*Stephegyne parviflora*) and *Barringtonia racemosa*, often twenty nests or more on a single tree crowded cheek by jowl in disorderly tiers, in amicable association with cormorants, darters, open-bill storks, and others. Not uncommonly also on single large peepul (*Ficus religiosa*) or suchlike trees overhanging a pond within a populated town. *Eggs*, 2 to 5 — most commonly 3 or 4 — dull sullied white, sometimes sparsely spotted and streaked with brown. Average size of 50 eggs 69.5×49.0 mm. (Baker). Both sexes share all the domestic chores. Period of incubation undetermined. Adult, on arrival at nest, greets incubating mate by craning forward and stiffly arching neck (as in aggressive vulture at a carcass), with bill partly open as if about to be sick! This gesture reciprocated by mate in the same way, both (?) birds uttering a low moan during the ceremony, sometimes crossing the stiffly arched necks the while. In nest relief the incoming bird is greeted by its incubating mate standing up on the edge of the nest, both birds ruffling their long, lax, under tail-coverts, bending their heads together down into the nest, shifting from one foot to the other, and making as if to adjust the twigs in the structure before the newcomer takes over. While one bird is brooding its mate often flies out, maybe half a kilometre or more, to fetch tender leafy babool branches to add to the nest. Twigs wrenched off topmost branches with much effort, and sections of floating *Ipomoea* vine collected from the water — sometimes absurdly large bushy branches, at others ridiculously tiny or scraggy leafless twigs or rush-blades. Twigs broken off tops of only certain individual trees to which many birds from the neighbourhood may resort, several tugging at the same time. When the forager returns with material, the sitting bird greets him (or her) with clattering of mandibles, bill-touching and tail-spreading.

In the pre-clambering stage, small nestlings very intolerant of hot sun; constantly shielded by parent standing on edge of nest with partly open, drooping wings. On fright they disgorge all undigested food and feign death in a realistic manner, crumpling up pathetically on the floor of the nest. Three-quarter-grown chicks clamber about the neighbouring branches. On return of foraging parent they quickly scramble back to the nest and beg with open bills and partly open flapping wings, bobbing or 'pumping' head up and down with a continuous rasping or scraping cry, rather as of vultures in copulation. Sometimes incoming parent sits inert for long periods beside the nest (in one case 45 minutes) before stepping on to the edge and disgorging 6 to 8 large fish, along with much slimy matter. The chicks gobble these up from the nest floor, the more impatient ones poking their

bills into the parent's gullet and tugging at the fish to speed it on its way. Possibly the delay in delivery is due to the necessity of predigesting the food for the young.

MUSEUM DIAGNOSIS. Chick (in down). Sullied white with naked black face and black bill tipped with pale greenish yellow or sulphur yellow, more extensively on upper mandible. Also yellow on short thick (naked) eyebrow, at anterior end of eye and along naked hindneck.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♀	490-510	252-278	240-250	150-172 mm. (Baker)

COLOURS OF BARE PARTS. Iris straw yellow; grey-brown in immature. Bill orange-yellow, darker and plumbeous at base; naked skin of face orange-yellow. Legs and feet brown or fleshy brown, sometimes nearly red.

Genus ANASTOMUS Bonnaterre

Anastomus Bonnaterre, 1791, Tabl. Encyc. Méth. Orn., 1: xciii. Type, by subsequent designation, *Ardea oscitans* Boddaert

Bill stout and strong; gonyes considerably upcurved; an open space between the mandibles for about two-thirds their length in the middle. Anterior half of upper mandible furnished with lamellae. Face, chin, and throat naked in adults; feathered all but the lores and throat in juveniles. Tarsus about equal to culmen in length; reticulated throughout. Toes and claws longer than in other genera of Ciconiidae.

61. Openbill Stork. *Anastomus oscitans* (Boddaert)

Ardea oscitans Boddaert, 1783, Table Pl. enlum.: 55 (Pondicherry)

Baker, FBI No. 2215, Vol. 6: 333

Plate 2, fig. 7, facing p. 32

LOCAL NAMES. *Gūṅlā*, *Ghūṅgil*, *Ghonghila* (Hindi); *Dokar* (Bihar); *Thonte bhāṅga*. *Shāmūkh bhāṅga*, *Shāmūkh khol* (Bengal); *Pouna konga* (Southern Gonds); *Galukonga* (Tehgu); *Naththai kuththi nārāi* (Tamil); *Gombelle kōkka*, *Bellan kōkka*, *Beli kava* (Sinhala); *Sāmuk bhāṅga* ('snail breaker'. Assamese, Nowgong); *Cherakokkan* (Malayalam).

SIZE. Large duck; length c. 81 cm. (32 in.). Standing c. 68 cm. (2½ ft.) to top of head.

FIELD CHARACTERS. A small stork, chiefly white with glistening purplish black or greenish black mantle (scapulars), wings, and tail. The peculiar-shaped bill with arching mandibles, leaving a narrow open gap between them, is diagnostic. Casually mistakable in the distance for White Stork, *Ciconia ciconia* (q.v.). Sexes alike.

In non-breeding plumage white upper parts replaced by dull smoky grey.

Young (immature). Darker smoky brown-grey with blackish brown mantle.

STATUS, DISTRIBUTION and HABITAT. Resident, shifting locally with water conditions. Possibly regular local migrant in parts (?). Throughout

the Indian Union, both Pakistans, Nepal (terai), and Ceylon. Affects inland waters — jheels, marshes, etc.; rarely river banks, and tidal mud flats.

Extralimital. Burma, Thailand, east through the Indochinese subregion.

MIGRATION. Apart from local shifts directly influenced by water conditions, performs some sort of regular migratory movement, as yet little understood. Birds are constantly reported dashing themselves against the dome of the lantern at various coastal lighthouses, e.g. Point Calimere (Tanjavur dist., Madras) and Sacramento (E. Godavari dist., Andhra).



× c. ½

This occurs only during the later monsoon months (August-September) on particular nights in the dark period of the moon, in overcast weather with low clouds, poor visibility and heavy wind. The falls occur before midnight or in the very early dark hours of morning, when a sedentary diurnal bird as this should normally have no business to be about!

Nestlings ringed at Bharatpur (Rajasthan) have been recovered a few months later up to 800 km. due east, suggesting definite seasonal movement. Further evidence of long migration provided by a bird ringed in Thailand (Wat Phailom, 14°06' N., 100°33' E.) on 5.ii.1965, recovered in East Pakistan (Jessore 23°20' N., 89°20' E.) on 26.vi.1966—a straight line distance of c. 1500 km. It is possible that after leaving the nest the young of this stork also disperse and wander far and wide, as young Grey Herons are well known to do.

GENERAL HABITS. Our smallest and commonest stork, with a wide local distribution. Met with singly or in small parties and flocks; large congregations when nesting. Like others of the family, regularly soars on thermals on a sunny day, circling for hours high up in the heavens in company with pelicans, ibises, and vultures, etc. The descent from aloft is a spectacular performance. With erect neck, head held high (cocked), wings half pulled in, the dangling legs partly flexed and straddled to balance — sometimes worked back and forth as in running—the bird hurtles steeply through space, banking, side-slipping, and gyrating violently, till within a few short seconds, from a mere speck in the sky, it has swished down to alight buoyantly on a tree-top in the colony, preceded by a vigorous braking with the wings.

The significance and function of the peculiar gap in the bill is obscure. It is not meant for *crushing* snail shells as sometimes suggested. However, it is obviously an adaptation to facilitate extraction of the soft body and viscera of molluscs from the shell, particularly of the large *Pila globosa* snails on which the bird commonly feeds. The precise mechanics of the process have not been observed. In captivity Jerdon (1862-4) records that even blinded Openbills secured the shell with their feet and after some manipulation 'succeeded in cutting off the operculum as cleanly as if it

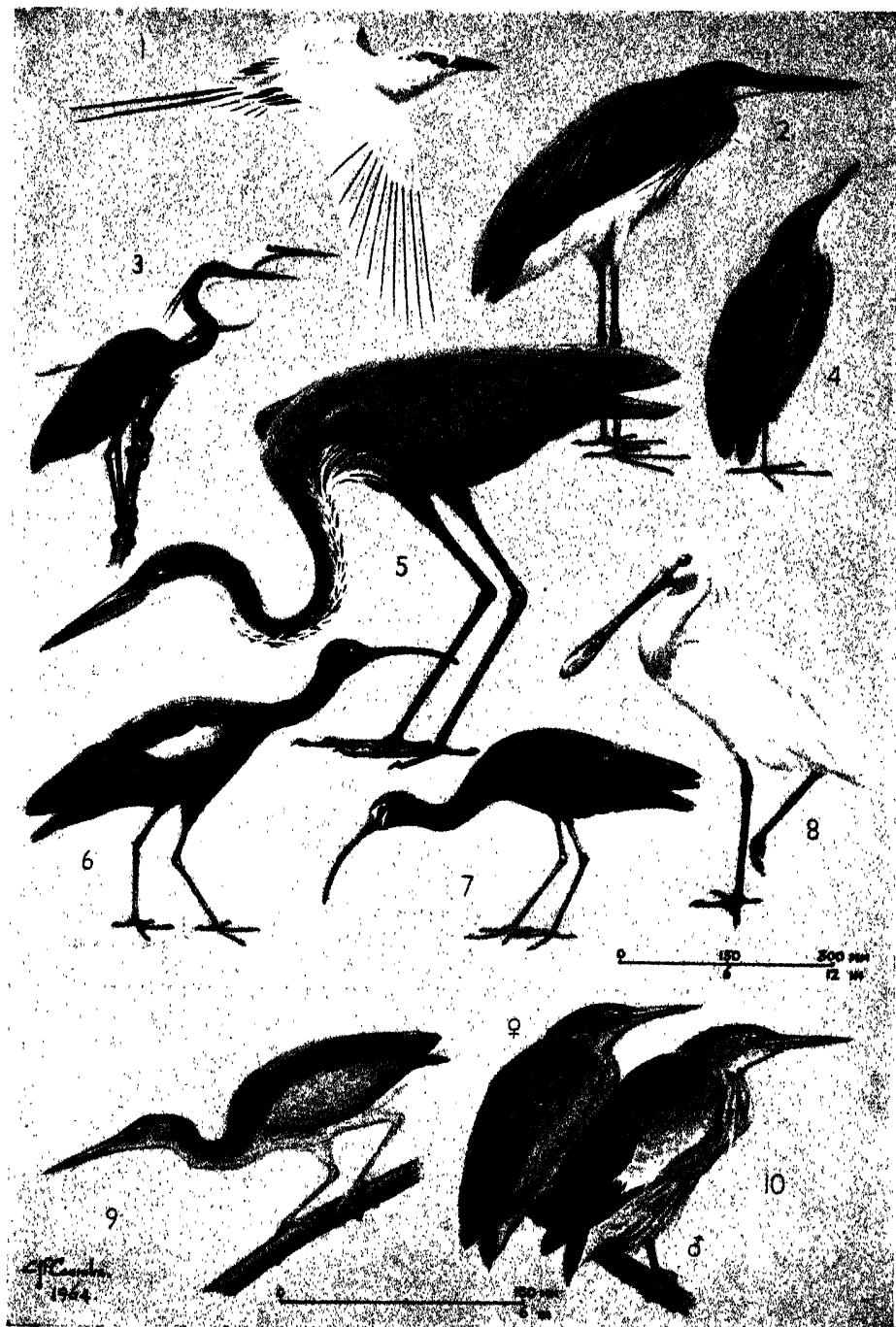


PLATE 5

1 *Phaethon r. rubricauda*, Redtailed Tropic-bird (18). 2 *Ardea insignis*, Great Whitebelled Heron (33). 3 *Egretta g. schistacea*, Indian Reef Heron (50). 4 *Botaurus s. stellaris*, Bittern (59). 5 *Ardea goliath*, Giant Heron (34). 6 *Pseudibis p. papulosa*, Black Ibis (70). 7 *Plegadis f. falcinellus*, Glossy Ibis (71). 8 *Platalea l. major*, Spoonbill (72). 9 *Ixobrychus sinensis*, Yellow Bittern (57). 10 *Ixobrychus minutus*, Little Bittern (55).

had been done by a razor', but so rapidly that he was unable to follow the details. After removing the operculum the bird inserted the tip of its mandibles and 'pulled out the entire shell fish almost to its utmost tip'. Examination of *Pila* shells immediately after they had been emptied by Openbills showed that pressure exerted by the mandibles on the thin and brittle rim of the mouth had cracked off a section of it, allowing the bill tip to be inserted below the operculum to prise it up. How the soft parts are extracted so cleanly and rapidly remains a puzzle. The shells are often tackled under water with the mandibles of the bird partly open and submerged to above the eyes. The rapidity with which the bill is raised again and again to swallow the morsels is quite amazing. Before withdrawing, the head is shaken from side to side in the water as if to wash off the mud from the food.

FOOD. Chiefly molluscs. From the bill and gullet of a specimen eight complete bodies and viscera of large *Pila globosa* snails have been taken. Also eats crabs, frogs, and other small animals found on its accustomed feeding marshes.

VOICE and CALLS. Very silent except for occasional deep moans and clattering of mandibles during greeting ceremony at nest. During copulation ♂ clatters his bill against that of ♀ (M. P. Kahl).

BREEDING. Colonial, in large mixed heronries sometimes several thousand pairs (e.g. at Keoladeo Ghana, Rajasthan). *Season*, mainly July to September in north India; November to March in the south; December to April in Ceylon; dependent on monsoon and water conditions. In drought years breeding may be skipped altogether. *Nest*, a rough circular pad of twigs with a central depression lined with leaves, etc. Built in trees such as *Acacia*, *Prosopis*, or *Barringtonia*, standing partially submerged in a jheel or monsoon-filled depression. Occasionally on the edge of a tank, in or close to a village. Many nests (up to 30 or more) on a single tree, in crowded association with darters, cormorants, and egrets with a tendency to segregation. Nests in such crowded situations become thickly caked with chalky white excreta from the jostling occupants of adjacent nests. *Eggs*, 2 to 4, rarely 5, sullied white, broad to moderate ovals, with a close texture. Average size of 100 eggs 57.9×41.2 mm. (Baker). Both sexes partake in all the domestic chores. Period of incubation believed to be 24-5 days; not confirmed. Chicks clothed in pale fawn-coloured down. Intolerant of the hot sun, and constantly shielded by parents standing on edge of nest with open drooping wings.

Fed by regurgitation by parent on to floor of nest, almost exclusively on soft bodies and viscera of large snails. Importunate chicks often short-circuit the food from the parent's open bill during the disgorgement process. On fright they throw up large boluses of it (once c. 58 gm.).

Till young flies from nest, bill of normal shape with close fitting mandibles; subsequent development of gap needs study.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	392-408	153-162	c. 140-150	183-217 mm. (Baker)

COLOURS OF BARE PARTS. Adult. Iris almost white, grey, or pale brown. Bill dull greenish horny, redder beneath; or dusky red. Orbital skin and naked lores black. Legs and feet dull fleshy. Grown nestling. Iris greyish brown. Bill dark brown; gular skin bright purple. Legs and feet greyish- or pinkish brown.

Genus CICONIA Brisson

Ciconia Brisson, 1760, Orn., 1: 48, 5: 361. Type, by tautonymy, *Ciconia* = *Ardea* *Ciconia* Linnaeus

Bill long, stout, tapering, and pointed, the lower mandible slightly inclined upwards anteriorly. Nostrils almost linear, basal, and pervious. Part of lores, and chin, naked. Lower half of tibia naked. Tarsi long and reticulated. Feet short with broad toes; claws very short, broad, and depressed. Feathers of lower neck elongated, partly overhanging breast. For further structural details see Witherby 1939, 3: 115.

62. Whitenecked Stork. *Ciconia episcopus episcopus* (Boddaert)

Ardea episcopus Boddaert, 1783, Table Pl. enlum.: 54 (Coromandel Coast)

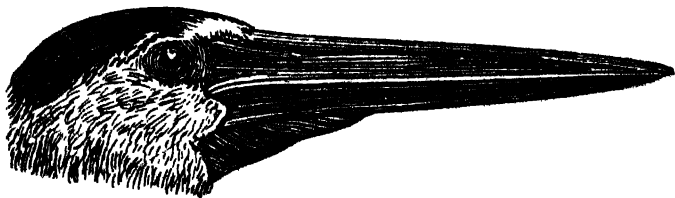
Baker, FBI No. 2210, Vol. 6: 342

Plate 2, fig. 8, facing p. 32

LOCAL NAMES. *Mānik jor* (Bengal); *Lāglāg* (Hindi); *Bāgūla*, *Kārdōk*, *Kandesur*, *Kowrow* (Marathi); *Kāli tūl* (Gujarat); *Vānnāthi nārāi* (Tamil); *Kanua* (Assam); *Kārim kōkku* (Malayalam); *Padili kokka* (Sinhala).

SIZE. Goose \pm ; standing c. 106 cm. ($3\frac{1}{2}$ ft.) to top of head.

FIELD CHARACTERS. A red-legged black and white stork with conspicuous white neck and black crown (like a padre's skull-cap). Rest of plumage including short tail black glossed with purple or greenish blue, except elongated under tail-coverts which are white. Sexes alike.



$\times c. \frac{1}{2}$

Young (immature). The glossy black replaced by dull dark brown, but sometimes as in adult. Feathers of neck longer and more fluffy. (For description of nestling c. 1 week old, see Whistler JBNHS 25: 746.)

STATUS, DISTRIBUTION and HABITAT. Resident. Sparsely distributed throughout the well watered parts of India, both Pakistans, Nepal (to c. 1250 m. elevation), Ceylon. Locally not uncommon. Low country, plateaux, and up to at least c. 650 m. in the peninsular hills in suitable biotope. Affects flooded grassland and fallows, irrigated ploughed fields, rain-filled puddles and depressions, banks of streams, seepage marshes, etc. Often deep in forest where marshes occur. Rarely on tidal creeks, and only far up from the sea.

Extralimal. Burma. Other races in Africa and SE. Asia.

GENERAL HABITS. Met with as a solitary, in pairs, or small parties — a flock of fifteen being the largest ever recorded by us (SA). Stalks about and feeds on dry or marshy land, seldom wading in water or immersing bill. Roosts at night in tall trees. Has the common habit of soaring on thermals on a sunny day and gliding in circles high up in the sky in company with related birds, and with vultures.

FOOD. Frogs, reptiles, crabs, molluscs, and large insects. Fish only when stranded high and dry by receding flood, or from drying up water-holes in forest streams, etc. Has been observed to pick winged termites emerging from the ground and also in the air, flying back and forth through a rising swarm and snapping up the insects in the bill (Ball 1874, SF 2:433).

VOICE and CALLS. Silent except for a clattering of the mandibles with neck bent over backwards and crown resting between the shoulders.

BREEDING. Individual; not in colonies. *Season*, variable; mostly July to September in northern India; December to March in the south; January to April in Ceylon. *Nest*, a massive structure of twigs, c. 1 metre in diameter, with a considerable central depression lined with straw, almost deep enough to hide the bird when sitting close. Usually built in a lofty tree such as *Salmaal* some 20 to 30 metres from the ground. Sometimes also lower down in medium sized trees. The same site may be used in subsequent years if the birds are left undisturbed. *Eggs*, broad to pointed ovals, 3 or 4, rarely 5, white, but becoming stained brown during incubation through contact with the bird's muddy feet. Very variable in size and shape. Average size of 100 eggs 62.9×47.4 mm. (Baker). Both sexes take part in building the nest and feeding the young; presumably also in incubation (unconfirmed). Period of incubation unrecorded. Young fed by regurgitation of predigested food by parent into nest, as in other storks.

MUSEUM DIAGNOSIS. Forehead, sides of head to behind the eye naked. Tail (black) short and deeply forked. Under tail-coverts (white), longer than tail and with stiff shafts, giving the impression of being the true tail.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	444-497	145-168	c. 152-180	199-255 mm. (Baker)

Two males collected by SA recently have wings 515-519 mm., showing the wide diversity in the range.

COLOURS OF BARE PARTS. Iris brown. Bill black, red on culmen, gonys, along the commissure, and at tips of both mandibles. Naked skin of face, chin, and throat slaty black. Legs and feet red lake.

63. White Stork. *Ciconia ciconia ciconia* (Linnaeus)

Ardea Ciconia Linnaeus, 1758, Syst. Nat., ed. 10, 1: 142 (Sweden)

Baker FBI No. 2207, Vol. 6: 321

Plate 6, fig. 2, facing p. 112

LOCAL NAMES. *Lāglāg*, *Hāji lāglāg*, *Ujli*, *Dhak*, *Gyār*, *Bādā rētwā* (Hindi); *Wadumi konga* (Telugu); *Lāklāk* (Sind).

SIZE. Goose \pm ; standing c. 106 cm. ($3\frac{1}{2}$ ft.) to top of head.

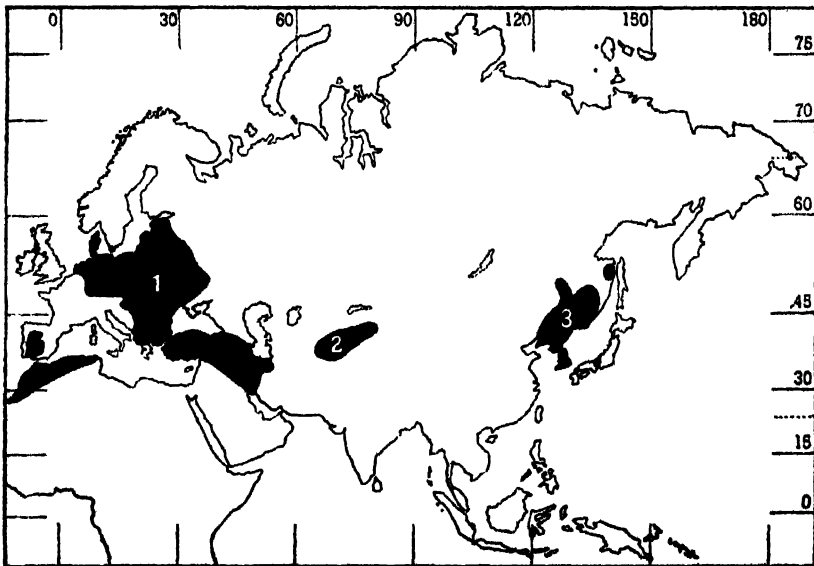
FIELD CHARACTERS. A long-legged, long-necked, egret-like bird, all white except for the longer scapulars and wing quills which are black. Legs and heavy pointed bill red. Feathers of head, neck, and breast long and lanceolate. Sexes alike.

Young (immature). Like adult, but the black parts are brown or tinged brown, and some of the shorter scapulars have brown centres.

Nestling (in down), snow white, with blackish bill and grey legs and feet.

STATUS, DISTRIBUTION and HABITAT. Winter visitor, arriving September/October, all gone by March/April. Fairly common in West Pakistan, northwestern India, Nepal terai. In smaller numbers east and south in the Gangetic Plain (Uttar Pradesh, Bihar, Orissa, W. Bengal), Assam, East Pakistan, Madhya Pradesh, Gujarat, Rajasthan, Maharashtra. Decreasingly south through the Deccan (Andhra, Madras, Mysore). The records from the eastern side of the subcontinent — Bengal, E. Pakistan, Assam, etc. — probably relate to the next subspecies (*boycciana*).

Ciconia ciconia



■ Breeding range

1 *C. c. ciconia*; 2 *C. c. asiatica*; 3 *C. c. boycciana*

There is a single sight record from Ceylon where it is evidently a rare straggler. Also a very doubtful and incredible one of a pair *nesting* in the NW. Province of the island in 1880 (Wait 1931 : 419).

Parties or small flocks by jheels and in marshy fields, etc.

Extralimital. Breeds in Europe north to 60° N. lat., N. Africa, Western Asia (Asia Minor, Iraq, Iran, Turkestan).

GENERAL HABITS. Stalks along sedately in search of food on marshy grassland, freshly drained fallows or moist fields ploughed for winter crops.

Though almost domesticated and enjoying protection by popular sentiment as a harbinger of good luck in most countries where it nests, the bird is usually wary and difficult to approach in its Indian winter quarters. Flight — a few flaps followed by a glide — appears leisurely, but is fast and strong. Royal Air Force pilots in Mesopotamia during World War I clocked the speed of migrating storks at about 48 miles (77 km.) per hour. Has the common habit of soaring on thermals and gliding in circles high up in the heavens for many hours at a stretch in company with its allies — other stork species, pelicans, etc. Often roosts at night in bare tree-tops.

FOOD. Frogs, reptiles, crustaceans, young rodents, occasionally fish, but very largely orthopterous insects, of which seasonally locusts in all stages — from egg to adult — form a considerable proportion. For this reason it enjoys additional protection in many countries both in its breeding and wintering areas.

VOICE. Poorly developed. Adults practically silent but for the characteristic bill-clattering of the family — a form of 'percussion music'. In this the head is thrown backward till the crown and culmen nearly touch the back. The mandibles are clattered rapidly, producing a castanet-like rattling, variable in volume and tempo. The puffed-out gular pouch functions as a resonator. While thus clattering, the head is slowly returned to the normal position and continued in an arc, till the bill nearly rests on the ground. Frequently both birds of a pair (especially in courtship) indulge in a bill-clattering duet, standing breast to breast.

MIGRATION. Little precise data available for India, but southward passage (autumn) observed through NW. Pakistan, across the Great Rann of Kutch, and Rajasthan. Northward passage (spring) recorded in Kurram Valley, April to end May (Whitehead, JBNHS 20: 976). A nestling ringed in Braunschweig, Germany (c. 52°N., 10°E.) and recovered a few months later in Bikaner, Rajasthan (c. 28°N., 73°E.), is our only positive evidence that some at least of our winter visitors may derive from Europe.

BREEDING. Extralimital. *Season*, March to May. *Nest*, a large stick platform placed on buildings, chimney stacks, cliffs or tall trees near human habitations. In the Middle East old mosques are commonly resorted to, whence the bird's claim to veneration by the Muslim populace. Known in Iran as *Hāji Lāglāg* from its habit of settling on mosques and the popular belief that it migrates annually for pilgrimage to Mecca! *Eggs*, 3 to 5, pure white. Average size of 120 eggs 73·2 × 58·8 mm. (Baker). Incubation period about 30 days.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	530—635	c. 150—220	c. 180—230	215—240 mm.
♀♀	530—590	c. 140—175		

COLOURS OF BARE PARTS. Iris brown or greyish brown. Bill bright red. Bare loreal and orbital skin, and chin, black. Legs and feet bright red.

The Turkestan race *asiatica*, supposedly larger and with a larger bill, is not sufficiently differentiated and of dubious validity.

64. Eastern White Stork. *Ciconia ciconia boyciana* Swinhoe

Ciconia boyciana Swinhoe, 1873, Proc. Zool. Soc. London : 513 (Yokohama)

Baker, FBI No. 2208, Vol. 6: 322

LOCAL NAMES. As for 63.

SIZE. Slightly larger than the preceding, but difference hardly perceptible in the field.

FIELD CHARACTERS. Differs from No. 63 chiefly in having a larger and black (*contra* red) bill.

STATUS, DISTRIBUTION and HABITAT. Uncommon winter visitor to Assam, Manipur, and E. Pakistan, where Stuart Baker saw a pair ('with conspicuous black bills') in Khulna.

Extralimital. Breeds from Lower Ussuri and Amur rivers to Korea and Japan.

GENERAL HABITS. Same as in the nominate race. Nothing specifically recorded in its Indian winter quarters.

MUSEUM DIAGNOSIS. Black bill and larger measurements:

♂ ♀ Wing 620-670; bill (from feathers) 195-222 (Baker), (from skull) 200-260 mm. (Hartert).

COLOURS OF BARE PARTS. 'Iris rosy pink with an outer ring of black' (David & Oustalet). Bill black in breeding season, tinged purplish at base. Other parts as in nominate race (Baker). 'Naked skin round eye red; skin of [throat] pouch red; bill blackish; legs and feet red' (La Touche).

65. Black Stork. *Ciconia nigra* (Linnaeus)

Ardea nigra Linnaeus, 1758, Syst. Nat., ed. 10, 1: 142 (Sweden)

Baker, FBI No. 2209, Vol. 6: 323

Plate 6, fig. 3, facing p. 112

LOCAL NAME. *Surnal* (Hindi).

SIZE. White Stork \pm ; standing c. 106 cm. (3½ ft.) to top of head.

FIELD CHARACTERS. A black stork with white underparts.

Adult. *Above*, including head and neck, black highly glossed with green, bronze and purple. *Below*, lower breast, belly, flanks and under tail-coverts white. Sexes alike.

Young (immature). Head, neck and upper breast dark brown, each feather tipped paler. Mantle dull brownish black. Underparts white.

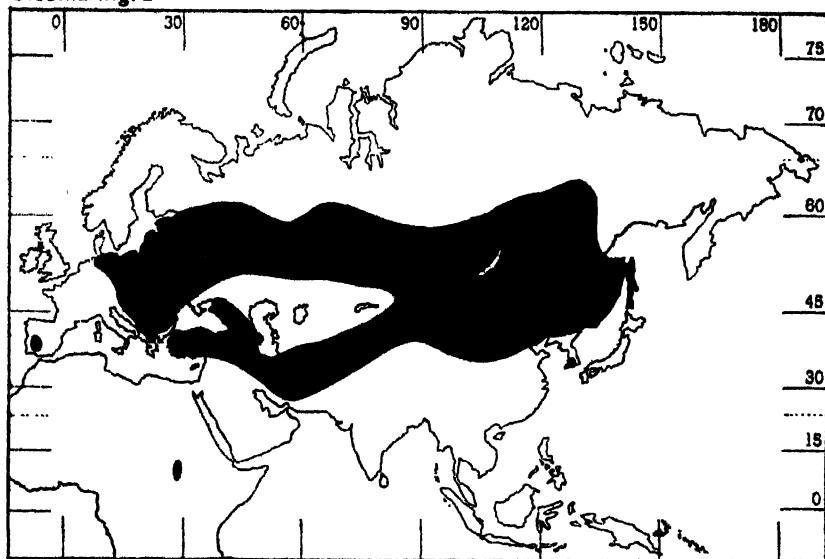
Nestling (in down). Snow-white with lemon-yellow bill and bright rosy legs which later turn almost white.

STATUS, DISTRIBUTION and HABITAT. Winter visitor to West Pakistan and northern India, from Baluchistan, Sind, NWF. Province, and the Punjab through the Nepal lowlands (to c. 900 m. alt.) and the Gangetic Plain to eastern Assam; south through Rajasthan normally to about Kutch and northern Gujarat. Rare in the Deccan, south to c. 18°N. lat. (Sholapur dist.). Has not been recorded in South India, and only once in Ceylon (Phillips, *Ibis* 1940: 333-4). Occurs on spring passage in Kashmir (Ward, JBNHS 17: 947), and in both spring and autumn in Gilgit (Scully, SF 10: 143).

Extralimital. Breeds in Denmark, Sweden, and Germany, east through Russia and Asia to N. China. Winters also in Africa.

GENERAL HABITS. Not appreciably different from those of the White Stork except that perhaps it usually keeps more to marshy ground and the neighbourhood of rivers and inland waters, and is even more shy and wary. Seen in pairs, small parties of 10 or 12, or large herds — an exceptional one of 'not less than 500' recorded by Hume near the Chenab river, Punjab (SF 1: 106). Its association with the Whitenecked Stork has been repeatedly remarked.

Ciconia nigra



■ Breeding range

FOOD. Animal matter — frogs, fish, crustacea, insects, and occasionally young or disabled rodents, birds, etc.

VOICE. Seldom heard in India, but in breeding season said to be more vocal than White Stork, adults producing a variety of guttural notes (reported by several observers as 'melodious'), and nestlings a heron-like chatter. Bill-clattering is rare.

BREEDING. *Season*, in central Europe April/May. *Nest*, a large stick platform built in a lofty pine, oak, or other tree, 10 to 25 metres from the ground; never on buildings. *Eggs*, 3 to 5, blunt oval, white. Average size of 100 eggs 65.3 × 48.7 mm. (Baker).

(For a full account of breeding, courtship, etc. see Witherby *et al.* 1939, 3: 116–18, mostly culled from the excellent observations of Horst Siewert in Germany, recorded in his book *Storche*, 1932.)

MUSEUM DIAGNOSIS. For full description of plumages etc. see Witherby 1939, 3: 117–18.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	520–605	160–190	c. 180–200	190–240 mm. (Baker)

Weight of an adult male recorded by Scully, 7 lb. (= c. 3.17 kg.).

COLOURS OF BARE PARTS. Iris brown or black. Bill red, pale at tip. Bare facial skin deep red. Legs and feet coral or scarlet-red.

MISCELLANEOUS. Longevity (from ringing data): 14+ years (Ring, 1962, 33: 148).

Genus *XENORHYNCHUS* Bonaparte

Xenorhynchus Bonaparte, 1855, Consp. Av., 2: 106. Type, by subsequent designation, *Mycteria australis* Shaw

Bill very long, and curved slightly upwards at the tip. Tarsus very long. Head and neck completely feathered.

66. **Blacknecked Stork.** *Xenorhynchus asiaticus asiaticus* (Latham)

Mycteria asiatica Latham, 1790, Index Orn., 2: 670 (India)

Baker, FBI No. 2211, Vol. 6: 326

Plate 2, fig. 10, facing p. 32

LOCAL NAMES. *Banaras*, *Lohārjāng*, *Loha sarang* (Hindi); *Lohār jāng*h or *Lohā jāng*ha (Bengal); *Telia hāreng* (Assam); *Periya nārdi* (Tamil); *Peddā nāllā konga* (Telugu); *Ali kokka* (Sinhala).

SIZE. Painted Stork +; standing c. 135 cm. (4½ ft.) to top of head.

FIELD CHARACTERS. A handsome black-and-white stork with massive black bill and long coral-red legs. In overhead flight large size, black neck and bill, pure white underparts (including all wing quills) with a broad black diagonal band across each wing diagnostic.

Adult. *Above*, head, neck, scapulars, and tail black, brilliantly glossed with green-blue, purple, and bronze. Back (interscapulars to upper tail-coverts) pure white. *Below*, from upper breast to under tail-coverts, pure white. Sexes alike except for colour of eyes; brown in male, conspicuous bright lemon-yellow in female.

Young (immature). Rather like a large washed-out example of Black Stork: the glossy black parts replaced by dull brown; white parts less pure and dusker.

Nestling (in down). Completely snow-white at first, head and neck changing to greyish black later.

STATUS, DISTRIBUTION and HABITAT. Resident. Widespread but sporadic and nowhere abundant. All India (rare in the south), both Pakistans, Nepal terai, Ceylon (low country dry zone). Affects lowland marshes, jheels, and large rivers. Occasionally tidal mangrove swamps.

Extralimital. Burma, Malaysia, Thailand, Indochinese countries. The race *australis* extends the species to Australia.

GENERAL HABITS. Keeps solitarily or in widely separated pairs apparently with recognized feeding territories; after the breeding season in small parties consisting of adults and young. Usually seen wading in shallow water or stalking sedately on a squelchy marsh in search of food, or squatted on its tarsi on dry ground at the edge. Has the characteristic stork habit of soaring and circling aloft in the heat of the day. Normally shy and suspicious.

FOOD. Chiefly fish, but also frogs, reptiles, crabs, and any other small animals that can be come by.

VOICE. Of adults unrecorded. When disturbed on nest, or otherwise agitated, e.g. a wounded bird about to be captured, the bill is clattered aggressively. Downy nestlings being hand-reared produced 'a sort of *chack* followed by *wee-wee-wee* repeated two or three times'. They also stretched up their necks and clattered their bills when suddenly disturbed, and then produced the above sounds (McCann, JBNHS 34: 581).

DISPLAY. Since Hume's vivid but fragmentary account in *Nests and Eggs of Indian Birds* (1890, 3: 266) nothing new has been added to warrant a reinterpretation of the antics described. Hume wrote: 'A pair will gravely stalk up to each other, and when about a yard or two feet apart will stand face to face, extend their long black and white wings, and while they flutter these very rapidly, so that the points of the wings of the one flap against the points of the other's wings, advance their heads till they nearly meet, and both simultaneously clatter their bills like a couple of watchmen's rattles.'

BREEDING. *Season*, overall September to December varying locally with the early or late cessation of the rains. *Nest*, an enormous platform of sticks, often thorny, 1 to 2 metres in diameter, with the central portion lined with straw, leaves, bits of rag, etc. Placed singly 20 to 25 metres up near the top of a large peepul (*Ficus religiosa*) or similar tree standing solitary in the midst of cultivation, not necessarily close to water. *Eggs*, 3 or 4, rarely 5, typical broad blunt smooth-textured ovals, white in colour with the inner membrane dull green. Average size of 75 eggs 72.1×53.4 mm. (Baker).

Both sexes build the nest and feed the young by regurgitation on to the nest floor. Share of the sexes in incubation, and incubation period, unrecorded.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	565-645	298-324	c. 300-333	257-281 mm. (Baker)

COLOURS OF BARE PARTS. Iris ♂ dark brown; ♀ lemon-yellow. Bill black. Naked skin of gular pouch and eyelids dull purple. Legs and feet coral-red.

Genus *LEPTOPTILOS* Lesson

Leptoptilos Lesson, 1831, *Traité d'Orn.*, livr. 8: 583. Type, by subsequent designation, *Ardea dubia* Gmelin

Bill very large, high at base, tapering gradually to tip. Culmen and commissure almost straight, the former about as long as, or a little longer than, tarsus. Nostrils small, narrow, placed near culmen. Head and neck naked except for sparse scattered hair-like feathers. Crown bald.

67. **Adjutant Stork.** *Leptoptilos dubius* (Gmelin)

Ardea dubia Gmelin, 1789, *Syst. Nat.*, 1(2): 624 (India)

Baker, FBI No. 2212, Vol. 6: 327

Plate 2, fig. 9, facing p. 32

LOCAL NAMES. *Hārgila*, *Gārūr*, *Pada dhauk* (Hindi); *Dhānk* (Mirshikars, Bihar); *Dusta* (Hindi in Deccan); *Hārgila* (Bengal); *Peenigālā kongā* (Telugu).

SIZE. Vulture +, standing 120–150 cm. (4 to 5 ft.) to top of head.

FIELD CHARACTERS. The largest and ugliest of our storks; black, grey and dirty white with naked reddish and yellow head and neck and a huge four-sided wedge-shaped bill. A naked pinkish gular pouch 25–35 cm. long, hanging from base of neck, distinguishes it from the Smaller Adjutant (next species).

In overhead flight the broad black wings with a whitish band along the middle are distinctive.

Adult (breeding). *Above*, including wings and tail, blackish slaty grey slightly glossed with green. Innermost secondaries and greater wing-coverts silvery grey forming a broad band on wing. A ruff of fluffy white feathers round base of neck. *Below*, white, including soft flimsy under tail-coverts.

Adult (non-breeding) lacks the silvery grey wing-band. **Sexes alike.**

Young (immature). Scantly feathered on the naked parts. Inner secondaries and coverts dark brown.

Nestling (in down). Pure white.

STATUS, DISTRIBUTION and HABITAT. Uncertain. Largely nomadic and local migrant. Breeding principally, and abundantly, in Burma, but only sporadically in Assam, Orissa, and E. Pakistan (Sunderbans). Not uncommon in northern India — chiefly during the rains — from Sind through Kutch, N. Gujarat, Rajasthan, Nepal terai, and the Gangetic Plain to Assam and E. Pakistan. Rare in the Deccan. Not recorded in the southern Peninsula, Andamans, or Ceylon. At jheels and marshes, and on outskirts of habitations.

Extralimital. Burma, Thailand, Malaysia, Indochinese countries, Sumatra, Java, Borneo.

GENERAL HABITS. Keeps singly or in small parties, stalking about with a martial gait (whence its English name) on marshland and jheels, particularly where the water is drying and concentrating the fish life in shallow puddles. When not actively feeding it spends the time standing hunched up, or squatting on its shanks head ludicrously drawn in between the shoulders, and often with the mandibles agape. The birds consort freely with kites and vultures to feast on animal carcasses dumped on the countryside or on village outskirts. In the last century, when municipal sanitation was more primitive than now, large numbers of Adjutants haunted the city of Calcutta, perching boldly on rooftops etc. for the offal and refuse, and rendered valuable service as scavengers. The flight, attained by running a few steps for the take-off with noisy flapping of the huge wings, is the acme of grace and buoyancy once the bird is fairly launched, and its effortless sailing in circles high up in the heavens in company with vultures and other storks is a sight that never fails to impress. The precise significance and function of the pendent sac at the base of the neck is obscure. It communicates with the nasal cavity and is unconnected with the gullet. Therefore it cannot receive or store food as is popularly believed.

FOOD. Fishes, frogs, reptiles (*Vipera russelli*, *Uromastix hardwickii* taken from stomachs), crustaceans, and almost any manageable living thing it can come by. Also largely carrion.

VOICE. Besides the characteristic bill-clattering of the family it is described as emitting a sound like 'the lowing of a cow when separated

from her calf' (Oates), and 'a loud grunting croak not unlike the low of a buffalo'. How these sounds are produced is not known since the bird is devoid of true voice muscles.

DISPLAY. Only incompletely recorded. Courtship dance described as similar to that of the Blacknecked Stork (q.v.), but copulation only observed in a tree and not following the dance on the ground (Baker).

BREEDING. *Season*, overall October to January, varying locally with early or late cessation of the rains. The only specific record for India is an old one (January 1883) of Baker's in the Khulna Sunderbans where about 40 or 50 pairs nested for many years on lofty trees in dense forest on the edge of a vast area of swamp and lake. The breeding grounds *par excellence*, however, seem to lie in S. Burma where incredible numbers congregate to breed on the pinnacles of the limestone rocks and in lofty trees along the Ataran river in Pegu district. It has been suggested that Indian Adjutants probably all migrate to this area to nest. (For a full account of the remarkable colony see Hume & Oates 1890, 2: 260-4.) According to Smythies 1953: 523, no recent information is available about this colony.

Nest, an enormous platform of coarse sticks 1 to 2 metres in diameter and up to a metre deep, placed far out on a near-horizontal branch of a lofty tree such as *Salmalia*. *Eggs*, 3 or 4 — sometimes 2, but never 5 — white, usually badly soiled. Broad ovals, more or less equal at both ends; fine-textured and smooth-surfaced with the inner membrane very dark green. Average size of 50 eggs 77.3×57.5 mm. (Baker). Both sexes share in nest building and incubation; presumably also in feeding the young (not recorded). Incubation period unknown.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂ ♀		(from feathers)		
	800-820	320-345	320-330	310-335 mm. (Baker)

COLOURS OF BARE PARTS. Iris white or yellowish white (adult); blue-brown (young). Bill pale yellowish or greenish fleshy, more red near base in breeding season. Bare skin of head dull reddish brown, turning to brick-red on hindneck and blackish on forecrown. Pouch and neck yellow; more pink on pouch and fleshy pink on the end, where it is moreover spotted with black. Legs and feet pale greyish white to pale horny brown.

'The pouch can be extended to a great size, looking like a child's pink balloon with smeary black spots' (Baker).

MISCELLANEOUS. The popular folk belief, recorded by the Mogul Emperor Baber in his Memoirs, still persists that if you split the head of an Adjutant before death you may extract from it the fabulous *Zahar-mohra* or 'snake-stone', allegedly a potent antidote against snake- and all other kinds of poison.

68. Lesser or Haircrested Adjutant. *Leptoptilos javanicus* (Horsfield)

Ciconia Javanica Horsfield, 1821, Trans. Linn. Soc. London, 13(1): 188 (Java)

Baker, FBI No. 2213, Vol. 6: 329

LOCAL NAMES. *Chinjārā*, *Chandana*, *Chandiari*, *Bang gor*, *Chhota gārūr* (Hindi); *Mūdānchūr*, *Madantāk* (Bengal); *Tokla moora* (= 'bald head', Assam); *Bor*

tokola (Nowgong, Assam); *Dodal konga*, *Dodal gatti gadu* (Telugu); *Meva kokku* (Tamil, Ceylon); *Māna* (Sinhala); *Vayalnaiicken* (Malayalam).

SIZE. Vulture +; standing 110–120 cm. (3½ to 4 ft.) to top of head.

FIELD CHARACTERS. A large stork with massive dirty yellowish wedge-shaped bill. Chiefly glossy metallic black above, white below, with sparse hair-like feathers on almost naked reddish yellow head and neck. Very similar to the Adjutant, but somewhat smaller size, less erect carriage, black instead of *slaty* upperparts, and absence of neck-pouch diagnostic. Sexes alike.

In non-breeding plumage lacks the copper spots near the tips of the larger secondary coverts.

Young (immature). Upper plumage less glossy; head and neck more feathered.

STATUS, DISTRIBUTION and HABITAT. Resident, nomadic (especially in the rains), and locally migratory. Assam, Bengal, East Pakistan, Bihar, Orissa, Kerala, Ceylon. Recorded also from Andhra, Uttar Pradesh (Lucknow Division), Delhi, Nepal terai, Kutch and Rajasthan, but uncommon in continental India. Affects well watered tracts — swamps and pools in forest, jheels, flooded land, etc.

Extralimal. Burma, Malaysia, Borneo, Java, Sumatra, S. China.

GENERAL HABITS. Usually solitary; not different from the Adjutant's except that it is less of a scavenger, does not haunt the neighbourhood of human habitations, and is much more shy and retiring. At close quarters the noise made by its wings in flight has been likened to the humming of telegraph wires in a wind.

FOOD. Fish, frogs, reptiles, crustaceans, and locusts recorded.

VOICE. 'Heard making same guttural noise as *Ciconia episcopus*' (Inglis, JBNHS 15: 75). No other data.

DISPLAY. Beyond that 'the nuptial dance consists of the same fantastic steps and gestures as those assumed by the Large Adjutant', and that both sexes take an equal part in the display, nothing recorded.

BREEDING. Baker, 1935, (4 : 448–9): 'Nesting in Ceylon, Travancore, parts of the Malabar coast, Madras Presidency, E. Bengal, and Assam.' For some of these areas, e.g. Kerala, only circumstantial evidence is so far available. Within our limits Assam is probably where the largest number of nests is to be found. *Season*, November to January. *Nest*, a huge stick platform c. 120 to 150 cm. in diameter and 30 to 120 cm. deep depending upon for how long annually renovated. Placed in lofty trees such as *Salmalia* standing in forest, 12 to 30 metres from the ground. *Eggs*, indistinguishable from those of the larger Adjutant even in size. Average of 50 eggs 76.4 × 55.3 mm. (Baker). A curious habit, apparently fairly general, is reported by Baker of the birds jabbing their eggs with their bills when agitated, as by a collector climbing up to the nest. Share of the sexes in the domestic chores, as well as incubation period, unrecorded.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	580–600	260–305	228–268	230–253 mm.

COLOURS OF BARE PARTS. Iris white. Bill dull yellow, the tip whitish and base tinged red in the breeding season. Bare skin of crown greenish brown. Face and neck yellow, tinged with brick-red in the breeding season. Legs and feet greenish brown to almost black (Baker).

In a freshly killed non-breeding adult ♂ noted as follows: Iris slaty grey. Bald crown greyish biscuit-colour. Bill pinkish biscuit colour. Sides of head and extreme base of neck pale pink; rest of neck bright turmeric yellow. Legs, feet and claws slaty black.

Family THRESKIORNITHIDAE. Ibises, Spoonbill

Comparatively long and bare-legged gregarious waterside or marsh birds related to and resembling storks, herons, and egrets, with whom they normally associate. Plumage in Indian representatives chiefly white, or black, or chestnut with metallic gloss. Bill long, slender, grooved and decurved (ibises), or extremely flattened and spatulate at tip (spoonbill). Nostril placed at base of a long, narrow groove on each side of culmen. Face and throat, or whole head and neck, bare in some species. Neck slender, longish, outstretched in flight. Wings long; tail short. Legs and toes moderately long; tibiae partly bare; toes webbed at base. Sexes alike or nearly so.

RANGE. N. and S. America, Africa (including Madagascar), the southern Palearctic Region, Australia. Some species migratory.

TECHNICAL DIAGNOSIS. Witherby 1939, 3: 118; Stresemann, 1927-34 Aves: 806 (under Plegadidae).

CLASSIFICATION. Ripley 1961, Synopsis: 22-23.

Key to the Indian forms

	Page
A Bill long, curved downward, generally dark coloured, plumage white, glossy black, or chestnut.....	1
1 Naked skin of head and neck black; plumage nearly all white, elongated inner secondaries forming slaty grey ornamental plumes (75 cm. = 30 in.).....	
..... <i>Threskiornis melanocephala</i> (adult, breeding)	110
Similar to above but plumes lacking.....	
..... <i>Threskiornis melanocephala</i> (adult, non-breeding)	110
Similar to non-breeding adult but neck and most of head feathered, primaries tipped with black	
..... <i>Threskiornis melanocephala</i> (juvenal)	110
Head black, naked, covered with red warts, neck feathered; plumage mostly glossy black with white patch on shoulder (68 cm. = 27 in.)	
..... <i>Pseudibis papillosa</i> (adult)	112
Resembling above but lacking red warts, and plumage overall dull glossless brown.....	
..... <i>Pseudibis papillosa</i> (juvenal)	112
Smaller (52 cm. = 25 in.). Plumage of head, neck, and underparts rich chestnut-brown, wings and tail glossed with metallic greenish purple.....	
..... <i>Plegadis falcinellus</i> (adult, breeding)	114
Similar to above but head and neck brown, streaked with white	
..... <i>Plegadis falcinellus</i> (adult, non-breeding)	114
Like non-breeding adult but overall plumage dull ashy brown instead of chestnut.....	
..... <i>Plegadis falcinellus</i> (juvenal)	114

	Page
B Bill long, straight, spatula-shaped at end, coloured black with terminal half bright yellow; plumage including bushy nuchal crest white (standing c. 60 cm. = 25 in.)..... <i>Platalea leucorodia</i> (adult, breeding)	116
Similar to above but lacking nuchal crest.....	
..... <i>Platalea leucorodia</i> (adult, non-breeding)	116
Like non-breeding adult but primaries tipped with black	
..... <i>Platalea leucorodia</i> (juvinal)	116

Genus THRESKIORNIS G. R. Gray

Threskiornis G. R. Gray, 1842, App. to List Gen. Bds.: 13. Type, by original designation, *Tantalus aethiopicus* Latham

Head and neck naked in adult. Bill deeply downcurved, stout, blunt. Nostril linear. Tibia feathered only on upper half; tarsus reticulated. Toes long, webbed between the bases, bordered by a membrane to the claws. Tail of twelve feathers. In breeding season inner secondaries longer than primaries, disintegrated, forming ornamental plumes.

The genus ranges from Africa through India and the SE. Asian countries and islands to Australia.

69. White Ibis. *Threskiornis melanocephala* (Latham)

Tantalus melanocephalus Latham, 1790, Index Orn., 2: 709 (India)

Baker FBI No. 2203 Vol. 6: 314

Plate 2, fig. 5, facing p. 32

LOCAL NAMES. *Mūnda*, *Safēd bāza*, *Didhar* (Hindi); *Kachator* (Purnea, Bihar); *Mündūkh* (Mirshikars, Bihar); *Kastechara*, *Sada dochara* (Bengal); *Boga akoki bog* (Assam); *Tattu kokka*, *Dahākatti kokka* (Sinhala); *Thālāikāthi chondan* (Tamil); *Kāshānti kokku* (Malayalam).

SIZE. Large domestic hen \pm ; length c. 75 cm. (30 in.).

FIELD CHARACTERS. A largish snow-white marsh bird with naked black head and neck, and long black downcurved curlew-like bill.

In flight bare blood-red patches on flanks and under wing conspicuous.

Adult (breeding), with some slaty grey in scapulars and in the elongated disintegrated inner secondaries. Long ornamental plumes overhanging base of neck. In non-breeding plumage the slaty grey scapulars, ornamental secondaries and neck plumes are replaced by ordinary feathers. Sexes alike.

Young (immature) has only face and round the eye bare; rest of head and neck feathered. In newly fledged (flying) juvenile, head and hind neck well clothed with black or slaty down. Front of neck covered with short white disintegrated feathers. Bare skin under wing black, not blood-red as in adult.

For downy chick see Museum Diagnosis.

STATUS, DISTRIBUTION AND HABITAT. Resident, nomadic (and/or locally migratory), depending on water conditions. All India, both Pakistans, Nepal terai, Ceylon. Plains and plateau country.

Affects rivers, jheels, marshes, inundated ploughed land and fallows; occasionally tidal mudflats and brackish lagoons.

Extralimal. Burma, sporadically to China and Japan.

GENERAL HABITS. Gregarious. Normally parties and moderate to large flocks, often associated with storks, spoonbills, and such other marsh-frequenting birds. Saunters actively on squelchy mud or in shallow water probing with partly open mandibles into the bottom ooze, often with head almost completely submerged. Morsels of food are forceped out and swallowed with an upward jerk of the bill. Flight strong and direct attained by steady rapid wing-strokes punctuated by short glides, the head and neck outstretched, either in V-formation or in evenly-spaced single file. Roosts and nests in trees.

FOOD. Almost entirely animal — fish, frogs, molluscs, insects, worms, etc. — but some vegetable matter (algae ?) also taken. Stomachs of small downy nestlings contained pulpy olive-brown and green vegetable matter, and elytra of tiny blackish beetles, *c.* 5 mm. long (SA).

VOICE. Normally silent. In the breeding season 'a remarkably loud booming call' (Doig); not confirmed by other observers. In breeding colony 'a series of peculiar grunts, not loud but vibrant', likened to the mumble of many people talking together (Bates). Subdued nasal grunts by adults on the nest tree (SA).

BREEDING. Colonially, in association with storks, herons, cormorants, and other marsh birds, with a tendency to segregation into discrete *mohallas*.

Season, in N. India June/July to October, varying with early or late monsoon and filling of tanks and jheels; in S. India and Ceylon November to February/March. *Nest*, a smallish platform of sticks *c.* 25 to 30 cm. across, usually unlined, built in moderate-sized trees (*Acacia*, *Prosopis*, *Barringtonia*, etc.) standing in or near water, or on the tops of partially submerged shrubs (*Zizyphus*, *Capparis horrida*, etc.); sometimes on the outskirts of a village. *Eggs*, 2 to 4, smooth-surfaced long ovals, chalky white with a faint bluish tinge. Immaculate or sparingly marked with small spots and blotches of light or dark brown, more densely at the broad end. Average size of 150 eggs 63.5×43.1 mm. (Baker). Both sexes take part in nest-building and all the domestic chores. Incubation period estimated at 23–25 days (unconfirmed). In the heat of the day, while incubating or standing about on the nest tree, the bill is partly open, the throat pulsating incessantly. Nest-feeding by regurgitation, the nestling wrestling with the parent's bill to receive food directly from gullet. Not picked up from nest floor as in storks. Nestlings commonly predated on by Pallas's and Spotted eagles (*Haliaeetus leucoryphus* and *Aquila clanga*) and other raptors. On onslaught by eagle the parents fluff out plumage menacingly, erect rump and under tail-coverts, lower head and bill and open out wings, biting the neighbouring twigs in rage and lunging out at the marauder viciously but usually ineffectively. The eggs and hatchlings (as of other birds in heronries) suffer heavy depredation from House Crows (*Corvus splendens*), which habitually infest such places.

MUSEUM DIAGNOSIS. Chick (in down) snow-white with forehead, crown (to below ear coverts), and nape, velvety black. Chin, ventral side of neck, down centre of abdomen, and underside of wings naked or almost naked, the skin pale vinous pink. Egg tooth persists at tip of short waxy bill till third or fourth day.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	343-370	139-170	c. 99-115	133-145 mm. (Baker)

[A freshly killed ad. ♂ (Gujarat) measured Wing 381; bill (from skull) 185; tarsus 119; tail 129 mm. (SA)]

COLOURS OF BARE PARTS. Iris red-brown or red. Bill black. Naked skin of head and neck bluish black. Bare skin of flanks and under wing blood-red. Legs and feet glossy black.

Genus *PSEUDIBIS* Hodgson

Pseudibis Hodgson, 1844, in Gray's Zool. Misc.: 86. Type, by monotypy,

Ibis papillosa Temminck

Only the head and nape naked in adults *contra* *Threskiornis* which has also the neck bare. Bill slenderer, legs and feet shorter than in *Threskiornis*. Plumage principally black. Inner secondaries of normal shape in breeding season (not lengthened or disintegrated), and no long ornamental plumes at base of neck.

70. **Indian Black Ibis.** *Pseudibis papillosa papillosa* (Temminck)

Ibis papillosa Temminck, 1824, Pl. Col., livr. 51, pl. 304 (India)

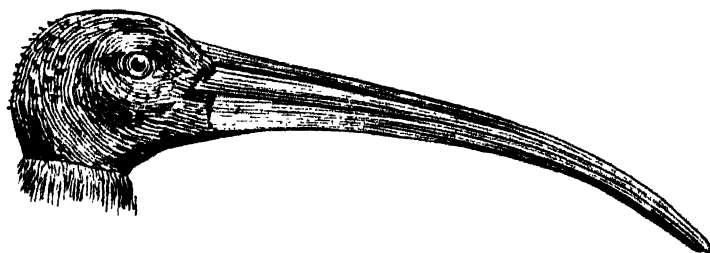
Baker, FBI No. 2204, Vol. 6: 316

Plate 5, fig. 6, facing p. 96

LOCAL NAMES. *Bāzā*, *Kālā bāzā*, *Kārān kūr* (Hindi); *Kālo dochara* (Bengal); *Kāla akohi bōg* (Assam); *Nella kankānām* (Telugu).

SIZE. Domestic hen \pm ; White Ibis —. Length c. 68 cm. (27 in.).

FIELD CHARACTERS. A distinctive glossy black marsh bird with slender downcurved curlew-like bill, a small but conspicuous white patch near shoulder of wing, and brick-red legs. A triangular patch of brilliant red warts covering top of naked black head. Sexes alike.



$\times c. \frac{1}{2}$

Yō'ung (immature). Overall dull glossless brown including feathered crown, head, and throat.

STATUS, DISTRIBUTION and HABITAT. Resident. West Pakistan (Sind), Gujarat, Rajasthan, and throughout the Gangetic Plain and peninsular India south to Mysore. Sparingly in Nepal (terai and dun), Bengal, and

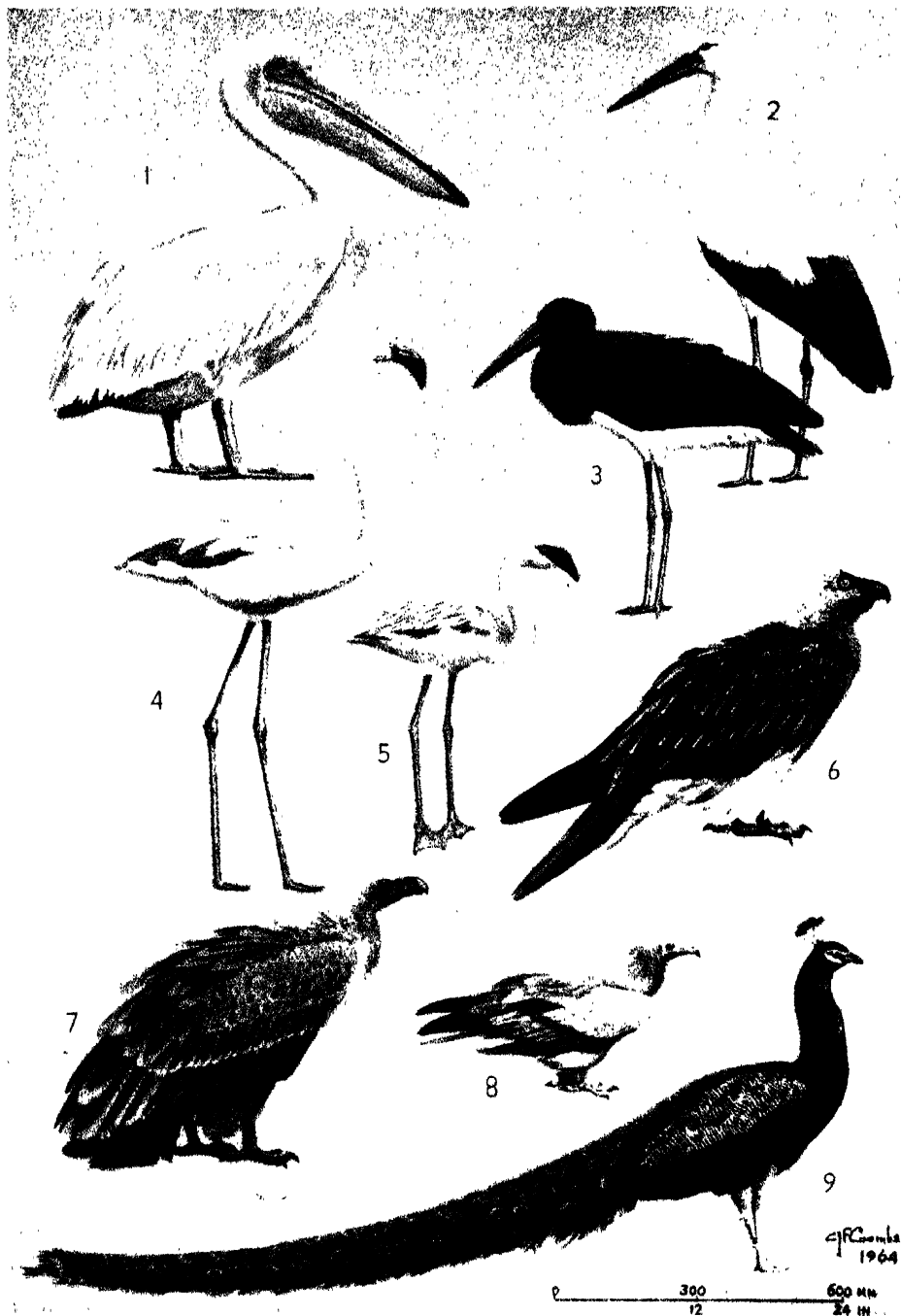


PLATE 6

1 *Pelecanus onocrotalus*, Rosy Pelican (20). 2 *Ciconia c. ciconia*, White Stork (63). 3 *Ciconia nigra*, Black Stork (65). 4 *Phoenicopterus roseus*, Flamingo (73). 5 *Phoenicopterus minor*, Lesser Flamingo (74). 6 *Gypaetus b. aureus*, Bearded Vulture (189). 7 *Gyps himalayensis*, Himalayan Gullion (181). 8 *Neophron p. pugnans*, Scavenger Vulture (187). 9 *Pavo cristatus*, Common Peafowl (311).

Assam. Not recorded from the West Coast, Kerala, Ceylon, or the Andamans. Affects dry plains and cultivated country.

Extralimital. Recorded as having occurred in Arakan, though the race normally found in Burma, Thailand, and the Indochinese countries is *davisoni* in which the red warty patch on head is obsolete.

GENERAL HABITS. Keeps in small parties of 3 or 4 or flocks of 8 to 10 individuals; sometimes larger. Less dependent on water than White Ibis, preferring to forage on the drier margins of jheels, river banks, and in stubble fields; only occasionally wading into puddles. Flight and behaviour similar to that of White Ibis.

FOOD. Among the stomach contents of specimens, Mason & Lefroy (1912) identified frogs, small fish, earthworms, beetles and other insects (including *Brachytrypes achatinus* adults, and larvae of *Cybister confusus*, *Agrotis* sp., and *Hydrophilus* sp.). In addition, lizards, small snakes, scorpions, crustaceans, and a quantity of grain have also been recorded.

VOICE. On the whole silent. A loud nasal screaming cry of two or three notes reminiscent of the Brahminy Duck (*Tadorna ferruginea*), uttered chiefly on the wing (SA).

BREEDING. Not in mixed heronries. Usually individual nests by themselves; rarely small colonies of 3 to 5 pairs in same tree. *Season*, variable: between March and October in N. India; later in Gujarat, Deccan, and the south. *Nest*, a large stick platform c. 35 to 60 cm. in diameter, 10 to 15 cm. deep, loosely and untidily lined with straw. Built in a large tree such as banyan or peepul, or among the bases of leaf stalks in a palmyra (*Borassus*) palm, 6 to 12 metres up. Old nests of kites and vultures frequently utilized. Fresh material added to the nests even when incubation well advanced. *Eggs*, 2 to 4, pale bluish green, some spotless but the majority sparsely flecked and blotched with pale reddish; broad to moderately long ovals with a smooth surface. Average size of 59 eggs 63·0 × 43·8 mm. (Baker). Both sexes incubate. Period of incubation, and other details, unrecorded.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	365-400	138-158	c. 75-85	165-194 mm. (Baker)

COLOURS OF BARE PARTS. Iris brownish yellow to bright orange-red. Bill plumbeous green to dull blackish green. Naked skin of head black; crown and nape bright coral-red or brick-red. Legs and feet brick-red.

Genus PLEGADIS Kaup

Plegadis Kaup, 1829, Skizz. Entw.-Gesch.: 82. Type, by monotypy,
Tantalus Falcinellus Linnaeus

Head feathered except on lores and a small area in front of eyes. Tarsi long, scutellated in front, reticulated behind. Toes long and slender; claw of middle toe pectinated. Bill long, curved, more slender even than in *Pseudibis*.

71. **Glossy Ibis.** *Plegadis falcinellus falcinellus* (Linnaeus)*Tantalus Falcinellus* Linnaeus, 1766, Syst. Nat., ed. 12, : 241 (Austria and Italy)

Baker, FBI No. 2206, Vol. 6: 318

Plate 5, fig. 7, facing p. 96

LOCAL NAMES. *Kavari, Kowar, Chhōta būza* (Hindi); *Kachia tora* (Bengal); *Thāt kākānām* (Telugu); *Kārāppu kottan* (Tamil, Ceylon); *Ratu das tuduwa* (Sinhala).

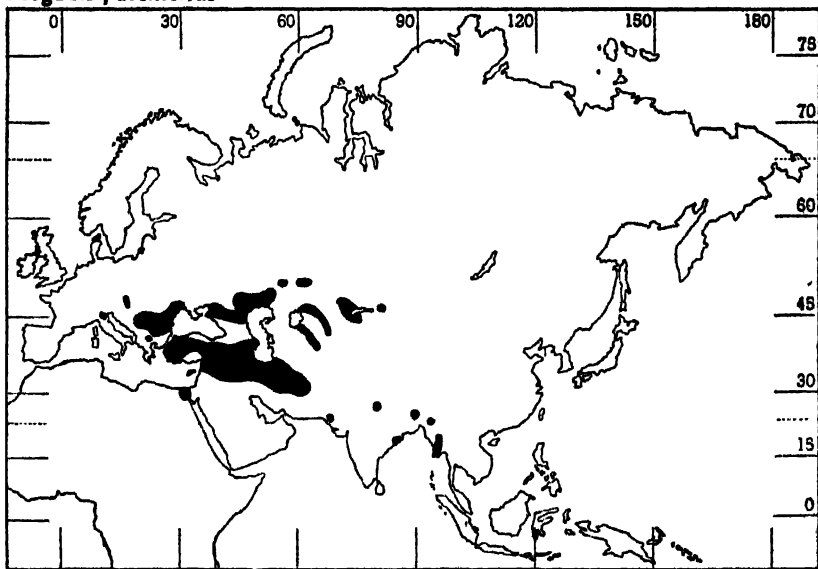
SIZE. Domestic hen \pm ; Black Ibis —. Length c. 52 cm. (25 in.).

FIELD CHARACTERS. A small blackish ibis with feathered head and characteristic slender downcurved bill.

Adult (breeding). *Above*, rich dark chestnut or maroon-brown, heavily glossed with green and purple on head, neck, chin, throat, lower back, and rump. Tail black glossed with green and purple. *Below*, chestnut. Under tail-coverts and axillaries deep purple. Sexes alike.

Adult (non-breeding). Head and neck brown, streaked with white. Scapulars and innermost wing-coverts glossy green-blue.

Young (immature). Like adult in winter, but dull (unglossed) ashy brown instead of chestnut.

Plegadis falcinellus

■ Breeding range

Nestling, clothed in black down. Bill rose-coloured, with a black band at middle and tip which disappear with fledging of chick (Heinroth).

STATUS, DISTRIBUTION and HABITAT. Partly resident and nomadic, partly winter visitor. West Pakistan (Sind), Uttar Pradesh, Nepal (plains and terai), Gangetic Plain, Madhya Pradesh, Deccan, Rajasthan, Kutch, Gujarat, Orissa, W. Bengal, E. Pakistan (Sylhet, Faridpur), Assam, Manipur. Very rare in Ceylon (vagrant ?). Frequents large jheels, marshes, and river banks.

Extralimital. S. Europe, the Mediterranean and Middle East countries, Baluchistan, Afghanistan, Turkestan, Burma. Also Africa, Madagascar, and parts of southern North America. The race *peregrinus* inhabits the Philippines and Indonesia to Australia.

MIGRATION. A juvenile ringed in the Volga Delta, USSR, *c.* 45°55' N., 47°45' E. (9.vii.1931) was recovered at Deolali, Nasik dist., *c.* 20°N., 74°E. (14.iii.1934). Another juvenile ringed in the same locality, 12.vii.1941, recovered in Malda district, West Bengal, *c.* 25°N., 88° 30' E. (*c.* 15.iv.1942). These constitute our first positive proof that the resident population is augmented in winter by northern migrants.

GENERAL HABITS. Gregarious; usually tame and confiding. Small parties or flocks of up to 40 or 50. Feeds like White Ibis on marshland or in shallow water, sometimes wading in up to the belly and submerging head completely. Flight — a series of rapid wing-beats followed by a glide — and other habits similar to White and Black Ibises (qq.v.). Flocks fly in V-formation or in diagonal wavy ribbons. Perches and roosts on trees.

FOOD. Molluscs, crustaceans, worms and insects. Possibly also tadpoles and small frogs as recorded elsewhere.

VOICE. Normally silent. In breeding season adults utter a peculiar bleating reminiscent of a sheep (Heinroth). Another call described as 'a decidedly corvine prolonged guttural croak' (Lilford).

BREEDING. Colonial; in mixed heronries. Sporadic. Recorded in Sind, Oudh, Orissa, Assam, Manipur. *Season*, mainly May to July. *Nest* smallish, of sticks, *c.* 30 cm. across and *c.* 12 cm. deep, on moderate-sized trees such as kändi (*Prosopis spicigera*) standing in clumps in or near water. *Eggs*, 2 or 3 (in Europe up to 5), deep unspotted blue-green, smooth-textured long ovals, more or less pointed at both ends, somewhat more at the small end. Average size of 100 eggs 52.18 × 36.9 mm. (Baker). Both sexes share incubation. Period 21 days (Heinroth). No details recorded in India; for Europe see Witherby 1939, 3: 123.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	248–298	99–144	<i>c.</i> 85–100	94–106 mm. (Baker)
Female smaller than male: for European birds Wing ♂ 290–306; ♀ 264–277 mm. Weight <i>c.</i> 750 gm. (Heinroth).				

COLOURS OF BARE PARTS. Iris grey, brown, or mottled grey and brown. Bill dark livid, olive-grey or plumbeous brown; ('bare skin at base lead-blue' — Ticehurst). Naked skin of face and round eye livid. Legs and feet bronze-brown, bluish ('greenish' — Ticehurst) above 'knee'.

MISCELLANEOUS. Longevity (from ringing data) *c.* 20 years (*Ring*, 1962, 33: 148).

Genus PLATALEA Linnaeus

Platalea Linnaeus, 1758, Syst. Nat., ed. 10, 1: 139. Type, by subsequent designation, *Platalea leucorodia* Linnaeus

Both mandibles greatly flattened, becoming broader and spoon-shaped at the tip, where they are slightly decurved. Face and throat naked. Legs long; tibia feathered; tarsus reticulated in front and behind. Toes long, bordered by a membrane, webbed at base.

72. **Spoonbill.** *Platalea leucorodia major* Temminck & Schlegel

Platalea major Temminck & Schlegel, 1849, in Siebold, Fauna Jap., Aves: 119, pl. 73 (Japan)

Baker FBI No. 2202, Vol. 6: 311

Plate 5, fig. 8, facing p. 96

LOCAL NAMES. *Chāmūch bāzā*, *Chāmchā* (Hindi); *Chinta*, *Khunte bāk* (Bengal); *Khantiya bōg* (Assam); *Gentā mūkū konga* (Telugu); *Chāppāi chondan* (Tamil, Ceylon); *Handi alawā* (Sinhala).

SIZE. Domestic duck +; standing c. 60 cm. (24 in.) to top of head.

FIELD CHARACTERS. A long-legged, long-necked, snow-white marsh bird with a distinctive long, flat, black-and-yellow spatula-shaped bill. A cinnamon-yellow patch at base of foreneck, naked yellow throat, and long, bare, black legs. Sexes alike. In breeding season with a long white bushy nuchal crest, erected in display or to express anger or other emotions.



× c. $\frac{1}{2}$

Young (immature), has the primary wing-coverts tipped with black. All primaries black-shafted, the first three largely blotched and mottled with black, 4th and 5th with black tips.

Nestling, covered with white down. Bill at hatching of normal shape, short, pink, and fleshy, gradually thickening and becoming bulbous at tip with slight decurvation. Assumes characteristic 'spoon' shape when chick full-fledged.

STATUS, DISTRIBUTION and HABITAT. Partly resident and nomadic, partly winter visitor. West Pakistan (Baluchistan, Sind), East Pakistan, practically all India, Nepal (terai), and Ceylon. Plains and plateau country. Affects marshes, jheels, rivers; occasionally tidal creeks and mangrove swamps.

Extralimital. 'Central Asia from China, southern Transbaikalia, Ussuri-land and Japan south to Syria, Egypt, India, and Formosa. Migratory in northern part of its range' (Peters).

MIGRATION. From older observations of vast flocks arriving in Uttar Pradesh in October (Reid 1887, SF 10: 77), and of flocks of many thousand birds each on the Chenab and Sutlej rivers near Multan in December including one estimated to contain ten thousand individuals (Hume 1873, SF 1: 106), the Spoonbill was well known to be, in part, an abundant winter migrant from extralimital areas. Direct evidence has since been provided by the recovery in India of four Spoonbills ringed as nestlings in the Caspian region of USSR (between c. 40° and 50°N. and 45° and 55°E.) in June-July, as follows: Kolhapur district, Maharashtra, (c. 17°N., 75°E.); Monghyr district, Bihar (c. 25°N., 86°E.); Tonk, Rajasthan (c. 26°N., 76°E.); Mandsaur district, Madhya Pradesh (c. 24°N.,

75°E.). Three of these were recovered between October and January; one curiously enough in July, almost exactly two years after ringing and moreover at the time when our local population here should be breeding. A fifth juvenile ringed near Yeysk, Sea of Azov (46°41'N., 38°15'E.) on 10.vi.1961 was recovered — again almost exactly two years later, in June 1963 — near Hyderabad in W. Pakistan (25°35'N., 68°25'E.).

GENERAL HABITS. Gregarious and sociable. Keeps in small parties and flocks of up to fifty or more, either by themselves or in association with egrets, ibises, and other marsh birds. Feeds more actively in mornings and evenings than during daytime, and is partly nocturnal. Wades into the shallows on the edge of a jheel or swamp and with outstretched obliquely poised, partly open bill sweeps from side to side in the water with a semi-circular scything action, raking the bottom ooze with the tip of the lower mandible as it moves forward. Where food is plentiful a compact, eager, jostling herd will advance almost at a run, working methodically back and forth over a particularly rewarding patch. Bouts of intense feeding activity alternate with pauses of quiescence when the entire herd will stand about listlessly with no apparent interest in food. Flight seemingly rather slow, with deliberate wing flaps — neck and legs extended. Flocks fly in diagonal wavy ribbons, each bird evenly spaced behind and to one side of the one in front.

FOOD. Small fish, tadpoles, frogs, molluscs, crustaceans, aquatic insects. Also some vegetable matter.

VOICE. Normally very silent; in breeding colony occasional short low grunts and bill-clattering.

BREEDING. Colonial. Usually in mixed heronries — sometimes very large ones, e.g. Keoladeo in Bharatpur (Rajasthan) — but with a tendency to segregation. *Season*, variable, depending on early or late monsoon and filling of tanks and jheels; normally July to October in N. India, November to January in S. India, December to April in Ceylon. *Nest*, a variable platform of sticks, sometimes a flimsy pad and at others a fairly substantial structure, lined in varying degree with grass or leaves. Built in clumps of moderate-sized trees (*Acacia arabica*, *Prosopis spicigera*, *Barringtonia racemosa*, etc.) standing partially submerged in a jheel. Rarely in reed-beds. Often many nests in the same tree almost touching one another. *Eggs*, 3 or 4, rarely 5, long ovals slightly pointed at one end, smooth surfaced. Chalky white in colour, sparsely marked with small blotches and spots of light to dark brown, sometimes with faint secondary markings of pale grey-brown or pinkish grey. Average size of 40 eggs 65.6 × 44.2 mm. (Baker). Both sexes take part in nest-building and incubation. Incubation period unrecorded in India; estimated as about 21 days.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	350-395	180-228	130-165	108-122 mm. (Baker)

COLOURS OF BARE PARTS. Iris dark brown to brownish crimson. Bill, upper mandible black; terminal half of 'spoon' bright yellow; lower mandible slaty grey.

Bare skin of face and throat canary or sulphur yellow, sometimes blotched with black on and above lores. Legs and feet black.

NOTE. The European breeding (n nominate) race is only slightly smaller with a smaller bill, but the measurements often overlap. Such examples, and borderline cases, are impossible to assign racially with confidence.

Family PHOENICOPTERIDAE: Flamingos

Large, excessively long-legged marsh birds with very long slender necks and peculiar thick lamellate bills sharply downcurved or 'broken' in the middle. Plumage largely pinkish white and crimson, with black remiges or wing-quills. Tibia bare; toes short and webbed. Sexes alike or nearly so.

ANATOMICAL DETAILS in Witherby 1939, 3: 162-3; Baker 1929, FBI 6: 372; Stresemann 1927-34, Aves: 804-5.

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- McCann, Charles (1939): 'The Flamingo (*Phoenicopterus ruber antiquorum* Temminck).¹ *J. Bombay nat. Hist. Soc.*, 41: 12-38.

Key to the Indian forms

- Larger (standing c. 140 cm. = 4½ ft.). Plumage rosy white with scarlet and black wings, upper mandible overlapping lower, throat naked
..... *Phoenicopterus roseus*
- Smaller (standing c. 90-105 cm. = 3-3½ ft.). Plumage deeper rose pink, upper mandible not overlapping lower, throat feathered.....
..... *Phoeniconaias minor*

Genus PHOENICOPTERUS Linnaeus

Phoenicopterus Linnaeus, 1758, Syst. Nat., ed. 10, 1: 139. Type, by monotypy,

Phoenicopterus ruber Linnaeus

Upper mandible overlapping lower; throat naked. See also under Family.

73. Flamingo. *Phoenicopterus roseus* Pallas

Phoenicopterus roseus Pallas, 1811, Zoogr. Russo-Asiat., 2: 207

(Mouth of Volga river, south Russia)

Baker, FBI No. 2241, Vol. 6: 373

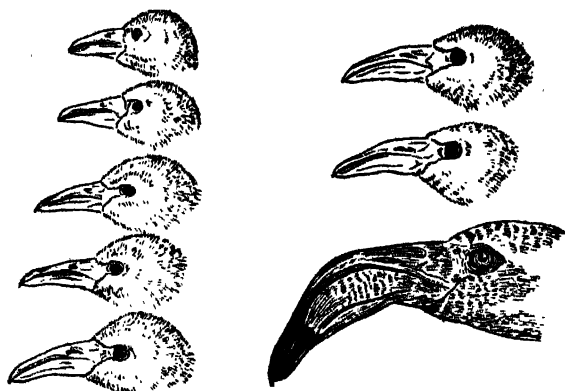
Plate 6, fig. 4, facing p. 112

LOCAL NAMES. *Bog häns*, *Rāj häns* (Hindi); *Kānmunthi*, *Kānthuti* (Bengal); *Chdrāj bāggo* (Mirshikars, Bihar); *Pu konga*, *Sāmūdrāpū chiluka* (Telugu); *Pūn nārāi*, *Urian* (Tamil); *Siyak karaya* (Sinhala); *Lākkā*, *Lākkē jāni* (Sind); *Hānj pākhi* (Kutch).

SIZE. Vulture +; standing c. 140 cm. (4½ ft.) to top of head.

FIELD CHARACTERS. A tall, long-legged, long-necked, stork-like marsh bird; rosy white with bright scarlet-and-black wings and massive pink bill

sharply downcurved ('broken') from about half its length. Sexes alike, but female somewhat smaller and paler.



Bills of flamingo chicks showing progressive growth to adult, $\times c. \frac{1}{4}$ (from a photograph of an exhibit of actual specimens arranged by C. McCann)

In flight the large size, long slender outstretched legs and neck, and black-and-scarlet underwing diagnostic.

Young (immature). Overall greyish brown, with brownish bill and dark slaty brown legs. Older birds have more greyish body with dark brown head and bill. Under wing-coverts and axillaries pale pink.

Chick (newly hatched to 2 or 3 days old). Nidifugous; covered with French grey powder-puff down, with soft pale pink bill and short salmon or orange-red legs; both changing to bluish grey in a few days. Very precocious and lively, slithering down from nest mound on alarm and scuttling off unsteadily, balancing itself with stumpy wings, frequently stumbling and rolling over.

STATUS, DISTRIBUTION and HABITAT. Resident, nomadic, and locally migratory. Evidently also extralimital migrant in part. Not uncommon, but capricious and sporadic, in W. Pakistan (Sind) and throughout the Indian Union (rare in Bengal and Assam), East Pakistan (rare), and Ceylon. Not recorded from Nepal. Affects large jheels, brackish lakes and lagoons, salt pans, estuaries, and tidal mudflats on the sea coast.

Extralimital. S. France, S. Spain, parts of N. and E. Africa, the Middle East and Caspian region to W. Siberia, south through Afghanistan.

MIGRATION. No ring recoveries or other positive proof, but suggestive circumstantial evidence of partial regular or erratic extralimital migration. Thus some plausibility in the speculation (McCann, loc. cit.) that under stress of hydrographic conditions breeding populations may shuttle between the major nesting sites in Europe, Africa, and Asia.

GENERAL HABITS. Highly gregarious, normally in small or large flocks and vast congregations at favourite feeding and nesting places, often numbering many hundred thousand. Feeds in shallow water — usually brackish and even concentrated brine — with head immersed. Sometimes swimming and 'up-ending' like duck in deeper water. The partly open bill is inverted

so that the upper mandible forms a scoop with culmen skimming or scraping the bottom ooze. The fleshy tongue works back and forth like a piston sucking in the water and mud, from which minute organisms are strained out by the lamellae along the edges of the bill. In dense congregations, where individual feeding space is restricted, the bird dabbles around pivoting on itself, the bill action describing a shallow circular trough or moat in the mud around the central 'turntable'. Such feeding circles, *c.* 60–90 cm. in diameter, almost touching one another, and sometimes many acres in extent, mark the places where flamingos have been feeding. Flight — with fairly rapid wing-strokes, neck fully extended in front and legs trailing well behind — in diagonal wavy ribbons, single file, or in the characteristic V-formation of geese. Rests usually standing on one leg with the long slender neck coiled round, and head tucked in feathers of back.

FOOD. *Chironomus* larvae, small molluscs and crustaceans (e.g. *Artemia salina*), tiny seeds of lacustrine plants (e.g. *Ruppia* spp., *Scirpus*), and organic mud. Possibly also small fish on occasion, e.g. *Cyprinodon dispar* which is very abundant in the bird's haunts in the Rann of Kutch.

VOICE. A single hoarse brassy goose-like honk. A constant babbling while feeding in company.

BREEDING. *Season*, in the Great Rann of Kutch, the only known nesting ground within our limits, variable, depending on hydrographic conditions, September/October to March/April. *Nest*, a truncated conical mound with shallow pan-like depression at top, from a few centimetres to half a metre high, of sun-baked mud scraped up from the vicinity when in semi-liquid condition, and daubed on. Built in hundreds close to one another in a compact, expansive 'city' covering several acres. Sometimes a merely slightly raised bed of mud pellets constitutes the nest. *Eggs*, normally 1 — occasionally 2 — rather like huge eggs of cormorants, from skim-milk to pale blue in colour overlaid with calcium deposit. Average size of 100 eggs, measured by Jourdain, 88.8 × 54.5 mm. (Baker). Three eggs from the Rann of Kutch measured 83 × 50, 83 × 53, 93 × 58 mm. (SA), falling within the maxima and minima of the above.

Both sexes take part in incubation. Period elsewhere stated as 30 to 32 days. Newly hatched, and small chicks, fed by parent on drops of a clear liquid from its bill tip, of unknown origin and composition. (For further accounts of ecology, bionomics etc. consult References under Family.)

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Bare tibia	Tarsus	Tail
♂♂	393–444	<i>c.</i> 139–164	<i>c.</i> 220–250	<i>c.</i> 311–327	152–189 mm.
♀♀	375–405	<i>c.</i> 120–143	—	—	—

(Baker)

A Kutch ad. ♂ (measured in the flesh) Wing 464; bill (from skull) 134; tarsus 324; tail 167 mm. (SA).

COLOURS OF BARE PARTS. Iris lemon-yellow. Bill, facial and gular skin pale pink to rich strawberry-ice colour, the first with black tip. Legs and feet variable pink, like bill.

Genus *PHOENICONAIAS* Gray

Phoeniconaias Gray, 1869, Isis: 440. Type, by monotypy, *Phoenicopterus minor* Geoffroy
Upper mandible not overlapping lower; throat well feathered.

74. **Lesser Flamingo.** *Phoeniconaias minor* (Geoffroy)

Phoenicopterus minor Geoffroy, 1798, Bull. Soc. Phil. Paris, 1: 98 (East Africa)

Baker, FBI No. 2242, Vol. 6: 375

Plate 6, fig. 5, facing p. 112

LOCAL NAME. *Chhōta rājhāns* (Hindi).

SIZE. Large duck; standing c. 90–105 cm. (3–3½ ft.) to top of head.

FIELD CHARACTERS. Smaller size, deeper rose-pink plumage, and dark coloured bill with crimson feathers around its base, distinguish it from its larger relative. Sexes more or less alike; female somewhat smaller and paler without crimson on back or breast.

In flight, crimson and black underwing, comparatively thicker neck, shorter trailing legs, and goose-like flight are leading pointers.

Young (immature). Overall greyish brown as in the larger flamingo with shorter, darker bill.

Chick. Pale grey natal down replaced by coarser growth in a few days. Colour of bill and legs at hatching unrecorded; when slightly older, black.

STATUS, DISTRIBUTION and HABITAT. Status uncertain. Recorded practically in all months, but so far not found breeding within our limits. Largely seasonal (?) visitor with erratic local movements. W. Pakistan and NW. India — Sind, Rajasthan, Gujarat, and the western Gangetic Plain. The Sambhar Salt Lake (Rajasthan) and the Little Rann (Gujarat) are two of its strongholds where vast concentrations, tens of thousand strong, occur irregularly. Stray specimens taken as far south as Bombay (Sálim Ali & Abdulali, JBNHS 40: 649), and Secunderabad, Andhra (Butler, SF 9: 436), and Chilka Lake, Orissa (January 1967) where reported as casual in winter but frequent. More restricted to salt and brackish lakes and tidal lagoons than large flamingo.

MIGRATION. No definite data.

GENERAL HABITS. Gregarious; large concentrations of the two species frequently together. Differs from the large flamingo chiefly in its ecological preference for heavily saturated brine and its feeding technique consequent upon the bill structure being specially adapted for filtering microscopic organisms (see Jenkin, loc. cit.). Usually walks along, or swims, in 30 to 45 cm. depth of still water swinging head from side to side in a scything motion, sucking in the algae from the surface layer (Brown, loc. cit.). However, in shallow brine only a few centimetres deep, e.g. in salt pans and in the Little Rann of Kutch, the bird feeds in the same way as its larger relative, partly or entirely submerging the head and inverting the bill. The difference in the size of food for which the bills are respectively adapted doubtless enables the two species to co-exist side by side without competing.

FOOD. Almost exclusively algae and diatoms. Occasionally insect larvae and copepods. Regularly drinks fresh water.

BREEDING. Not yet recorded in India, but good circumstantial evidence from Little Rann of Kutch where large numbers of quite small immature

so that the upper mandible forms a scoop with culmen skimming or scraping the bottom ooze. The fleshy tongue works back and forth like a piston sucking in the water and mud, from which minute organisms are strained out by the lamellae along the edges of the bill. In dense congregations, where individual feeding space is restricted, the bird dabbles around pivoting on itself, the bill action describing a shallow circular trough or moat in the mud around the central 'turntable'. Such feeding circles, c. 60–90 cm. in diameter, almost touching one another, and sometimes many acres in extent, mark the places where flamingos have been feeding. Flight — with fairly rapid wing-strokes, neck fully extended in front and legs trailing well behind — in diagonal wavy ribbons, single file, or in the characteristic V-formation of geese. Rests usually standing on one leg with the long slender neck coiled round, and head tucked in feathers of back.

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BREEDING. *Season.* in the Great Rann of Kutch, the only known nesting ground within our limits, variable, depending on hydrographic conditions, September/October to March/April. *Nest*, a truncated conical mound with shallow pan-like depression at top, from a few centimetres to half a metre high, of sun-baked mud scraped up from the vicinity when in semi-liquid condition, and daubed on. Built in hundreds close to one another in a compact, expansive 'city' covering several acres. Sometimes a merely slightly raised bed of mud pellets constitutes the nest. *Eggs*, normally 1 — occasionally 2 — rather like huge eggs of cormorants, from skim-milk to pale blue in colour overlaid with calcium deposit. Average size of 100 eggs, measured by Jourdain, 88.8×54.5 mm. (Baker). Three eggs from the Rann of Kutch measured 83×50 , 83×53 , 93×58 mm. (SA), falling within the maxima and minima of the above.

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MUSEUM DIAGNOSIS

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Baker, FBI No. 2242, Vol. 6: 375

Plate 6, fig. 5, facing p. 112

LOCAL NAME. *Chhōta rājdhāns* (Hindi).

SIZE. Large duck; standing c. 90–105 cm. (3–3½ ft.) to top of head.

FIELD CHARACTERS. Smaller size, deeper rose-pink plumage, and dark coloured bill with crimson feathers around its base, distinguish it from its larger relative. Sexes more or less alike; female somewhat smaller and paler without crimson on back or breast.

In flight, crimson and black underwing, comparatively thicker neck, shorter trailing legs, and goose-like flight are leading pointers.

Young (immature). Overall greyish brown as in the larger flamingo with shorter, darker bill.

Chick. Pale grey natal down replaced by coarser growth in a few days. Colour of bill and legs at hatching unrecorded; when slightly older, black.

STATUS, DISTRIBUTION and HABITAT. Status uncertain. Recorded practically in all months, but so far not found breeding within our limits. Largely seasonal (?) visitor with erratic local movements. W. Pakistan and NW. India — Sind, Rajasthan, Gujarat, and the western Gangetic Plain. The Sambhar Salt Lake (Rajasthan) and the Little Rann (Gujarat) are two of its strongholds where vast concentrations, tens of thousand strong, occur irregularly. Stray specimens taken as far south as Bombay (Sálim Ali & Abdulali, JBNHS 40: 649), and Secunderabad, Andhra (Butler, SF 9: 436), and Chilka Lake, Orissa (January 1967) where reported as casual in winter but frequent. More restricted to salt and brackish lakes and tidal lagoons than large flamingo.

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FOOD. Almost exclusively algae and diatoms. Occasionally insect larvae and copepods. Regularly drinks fresh water.

BREEDING. Not yet recorded in India, but good circumstantial evidence from Little Rann of Kutch where large numbers of quite small immature

birds in brown plumage with black legs and bill in company with adults observed (SA) and frequently reported. Breeds abundantly on the soda lakes of N. Tanganyika (Africa), building mud nests similar to the large flamingo's.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♂	329-354	100-118	c. 190-242	c. 120-142 mm.
♀ ♀	310-325	c. 93-104	—	—

(Baker)

COLOURS OF BARE PARTS. Iris red. Bill dark lake-red with black tip. Legs and feet red.

Order ANSERIFORMES

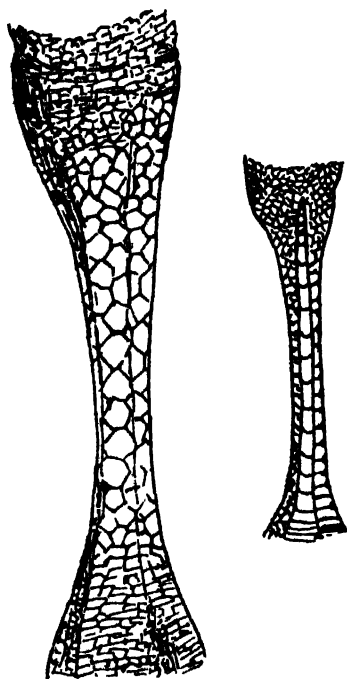
Family ANATIDAE: Ducks, Geese, Swans

A group of large, conspicuous water birds perhaps more generally known and recognized than any other, even by persons whose interest in birds does not extend beyond hunting them or purely as items on the menu. By virtue of the regularity of their seasonal appearances and disappearances, their spectacular flights, and their abundance and widespread occurrence in winter on all types of inland waters throughout the country, they perhaps also provide the most tangible example to the popular mind of the phenomenon of bird migration.

SIZE. Very diverse, from considerably larger than a Vulture (swan) to about that of a Pigeon (Cotton Teal). Colour from wholly white (swan) to combinations of grey, brown, black, and green with metallic reflections in many attractive patterns. Most ducks with conspicuous metallic 'speculum' or white patch on wing. Bill typically broad, flat, rounded at tip, and with a comb-like fringe or lamellae for straining out food particles from water in which they chiefly feed. Wings in most species rather narrow and pointed, adapted for swift and long-ranging flight. Tail short. Legs short; feet webbed. The majority of our species are migratory, originating from the Palaearctic Region (see map, p. xxxvii).

FOOD. Animal and/or vegetable matter. Obtained in water, marshes, or meadows and fields by dabbling, diving, or grazing.

BREEDING. On ground, in holes in ground, or hollows in tree-trunks, etc. Young nidifugous, down-covered.



A

B

Tarsus of Greylag Goose (A) and Mallard (B) to illustrate reticulated tarsus of swans and geese and partially scutellated tarsus of ducks

ANATOMICAL DETAILS. Witherby 1939, 3: 167; Stresemann 1927-34, Aves: 794-97; Baker 1929, FBI 6: 377-8.

CLASSIFICATION and TAXONOMY. Delacour, J. and Mayr, E. 1945, 'The Family Anatidae.' *Wilson Bulletin*, 57: 3-55; Ripley, S. D. 1961, *A Synopsis of the Birds of India and Pakistan*, pp. 25-40; Peters, J. L. 1931, *Check-list of Birds of the World*, 1: 143-89.

GENERAL BIOLOGY: Delacour, J. 1964, *The Waterfowl of the World*, Vol. 4.

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Key to the Genera

	Page
A Hind toe not lobed.....1	
B Hind toe very narrowly lobed.....2	
C Hind toe broadly lobed.....3	
1 Neck as long as, or longer than, body..... <i>Cygnus</i>	134
Neck not as long as body.....a	
a Plumage on sides of neck longitudinally furrowed, tail white or tipped with white..... <i>Anser</i>	125
Plumage on sides of neck unfurrowed, tail not tipped with white.....I	
I Distance from tip of bill to gape slightly more than one-half length of tarsus..... <i>Branta</i>	124
Distance from tip of bill to gape as long as or longer than tarsus.....a ¹	
a ¹ Underparts white..... <i>Sarkidiornis</i>	192
Underparts not white.....b ¹	
b ¹ Upperparts shiny blue-green..... <i>Cairina</i>	193
Upperparts brown..... <i>Rhodonessa</i>	174
2 Bill short and goose-like.....b	
Bill rather flat and broad.....c	
b Head crested, primaries edged with silvery grey..... <i>Aix</i>	188
Head not crested, primaries not edged with silvery grey..... <i>Nettapus</i>	190
c Lower portion of tarsus in front reticulated, primaries equal to secondaries in length..... <i>Dendrocygna</i>	138
Lower portion of tarsus in front scutellated, primaries considerably longer than secondaries.....II	
II Entire outer web of inner secondaries chestnut..... <i>Tadorna</i>	141
Outer web of inner secondaries not chestnut*..... <i>Anas</i>	145

* not to be confused with the *tips* of secondary coverts which are chestnut in several species of *Anas*.

	Page
3 Bill long and thin with saw-like teeth on edges of both mandibles...	
.....	<i>Mergus</i> 200
Bill not like above.....d	
d Tail feathers narrow and very stiff.....	<i>Oxyura</i> 208
Tail feathers normal.....III	
III Under wing-coverts dark.....a ³	
Under wing-coverts white or whitish.....a ³	
a ³ Nostrils situated on culmen about one-third of the distance from base to tip.....	<i>Clangula</i> 196
Nostrils situated on culmen about two-thirds of the distance from base to tip.....	<i>Bucephala</i> 198
a ³ Width of culmen becoming narrower towards tip, lamellae coarse and prominent	<i>Netta</i> 177
Width of culmen becoming broader towards tip, lamellae fine and not prominent.....	<i>Aythya</i> 179

Genus BRANTA Scopoli

Branta Scopoli, 1769, Annus I, Hist. Nat.: 67. Type, by subsequent designation,
Anas bernicla Linnaeus (Bannister, 1870)

Bill very small with no serrations visible on the edge of the upper mandible as
in *Anser* q.v. For further particulars see Delacour, 1: 145.

75. Redbreasted Goose. *Branta ruficollis* (Pallas)

Anser ruficollis Pallas, 1769, Spic. Zool., fasc. 6: 21, pl. 4 (Lower Ob, Southern Russia)
Baker, FBI No. 2259, Vol. 6: 407

LOCAL NAMES. None recorded.

SIZE. Domestic duck \pm ; length c. 61 cm. (24 in.).

FIELD CHARACTERS. A small brightly coloured goose, largely black and
chestnut, strikingly marked with white.

Adult. *Above*, crown, dorsal side of neck, back and rump black, with
two conspicuous grey bars on closed wings. Sides of head and face boldly
patterned with white and chestnut. *Below*, ventral side of neck and upper
breast bright chestnut separated from black hindneck and black lower
breast by running white bands. Abdomen, vent, and a broad horizontal
band on flanks white. Sexes alike.

Young (immature) has the black parts browner and duller and the
chestnut parts paler and more cinnamon.

STATUS, DISTRIBUTION and HABITAT. Rare straggler. Has only been
observed thrice within our limits: once in Madhya Pradesh in 1836 (Hume
1880, SF 8: 421) and twice in Assam on the Brahmaputra river (Baker);
not more recently than 1907.

Extralimital. 'Breeds on the Siberian Tundra from the Ob to the
Khatanga. Winters in the southern part of the Caspian Sea and the Aral
Sea' (Peters).

GENERAL HABITS. See Delacour, 1: 181. Nothing recorded in India.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂ ♀	342-363	23-27	52-58	100-110 mm. (Delacour)

COLOURS OF BARE PARTS. Iris hazel to brown, 'chestnut' (Witherby). Bill and legs black (Baker).

Genus *ANSER* Brisson

Anser Brisson, 1760, Orn. 1: 58, 6: 261. Type, by tautonymy, *Anser domestica* = *Anas anser* Linnaeus

Bill short and high at base; nostrils situated half way between base and tip, the latter furnished with a nail-like dertrum. Tarsus fairly long and strong. Wing long and pointed. Tail short and rounded, of sixteen to eighteen feathers.

Key to the Species

		Page
A	Head white with two black bands at nape..... <i>A. indicus</i>	131
B	Head dark.....1	
1	Nail of maxilla black..... <i>A. fabalis</i>	125
	Nail of maxilla white.....a	
a	No white or very little white on forehead; rump grey, legs pink <i>A. anser</i>	129
	Considerable white on forehead and around base of bill; legs reddish-flesh to orange-yellow.....I	
I	Wing over 380 mm..... <i>A. albifrons</i>	126
	Wing under 380 mm; swollen yellow ring round eye..... <i>A. erythropus</i>	128

ANSER FABALIS (Latham)

Key to the Subspecies

Bill and legs orange-yellow, occasionally pink

Wing 440-562 mm., bill 64-87 mm.....*A. f. middendorffi*

Wing 405-462 mm., bill 51-66 mm.....*A. f. rossicus*

76. **Forest Bean Goose.** *Anser fabalis middendorffi* Severtzov

Anser middendorffi Severtzov, 1873, Vert. goriz. rosprostr. tark. zhiv.: 149 (Sibérie Orientale = Oudskoi Ostrog.). (= *sibiricus* Alphéraky)

77. **Tundra Bean Goose.** *Anser fabalis rossicus* Buturlin

Anser serrirostris rossicus Buturlin, 1933, Opredelitel promyslovikh pitz. d. h. Best, Buch der jagdbaren Vögel: 60 (West Siberian Tundra. Locality restricted by Dementiev, 1936, Alauda: 190, to Beluchia Guba, Jamal, Taimyr).

Baker, FBI No. 2256, Vol. 6: 403 (= *A. neglectus*)¹

¹ Sushkin's Goose, *A. f. neglectus*, recorded in winter from Assam, is now considered merely a colour phase of the mixed population *A. fabalis rossicus* (with pink bill and legs) breeding in northern USSR.

SIZE. Domestic goose \pm ; length c. 76 cm. (30 in.).

FIELD CHARACTERS. A large brown goose with an elongate body, long neck, and longish slender bill making somewhat straight line with forehead; black on basal half, yellow or pink on terminal half. Distinguished from the Eastern Greylag, which it resembles, in being less grey more brown, with uniformly dark brown head and neck contrasting with lighter breast and back. Also by longer neck, less tubby body, and slenderer and longer *particoloured* bill *contra* all pink in Greylag.

STATUS, DISTRIBUTION and HABITAT. Vagrant. Three specimens ('*neglectus*') recorded from Assam by Baker. Possibly both forms occur less rarely in winter, but unidentified.

Extralimital. *A. f. middendorffi* breeds in forests of eastern Siberia from the Khatanga to the Kolyma, south to the Altai. Winters in eastern China, northern Mongolia, and Japan.

A. f. rossicus breeds in Novaya Zemlya and on tundra shores of Arctic Russia and Siberia west of the Taimyr Peninsula. Winters in Europe south to Italy; in Asia to Turkestan and China.

MUSEUM DIAGNOSIS. *A. f. rossicus* differs from *A. f. middendorffi* in being somewhat stockier and less elongate in body, with the bill shorter and higher at base. Lower mandible deep and distinctly curved outward, the nail at tip long, oval, and tapering (*contra* lower mandible straight and nail rounded in *middendorffi*). Normally no narrow band of white feathers around base of bill in either.

MEASUREMENTS

A. f. middendorffi ♂ ♀ Wing 440–562; bill 64–87 mm.; visible depth of lower mandible 7–10 mm.

A. f. rossicus ♂ ♀ Wing 405–462; bill 51–66 mm.; visible depth of lower mandible 7–10 mm.

COLOURS OF BARE PARTS. Iris brown. Terminal half of bill, legs and feet orange-yellow; often pink in *rossicus*.

[*Synopsis* (p. 26) includes the Pinkfooted Goose, *Anser fabalis brachyrhynchus* Baillon, in the Indian avifauna chiefly on the basis of the record of one shot in Bikaner, Rajasthan, in December 1948 (JBNHS 46: 186–7). The identity of the specimen mentioned by Baker (Fauna 6: 403) as taken by his collector in the Surma Valley, Assam, was doubted by Dr C. B. Ticehurst (JBNHS 34: 489) who pointed out that this goose has a limited and distinctly western distribution in winter and not a single record was known even so far east as European Russia. Baker's specimen is apparently non-existent, but the one from Bikaner in the BNHS collection has been re-examined by Mr Humayun Abdulali and one of us (SDR) and proves in fact to be a young Whitefront, *Anser albifrons albifrons*. In the absence of any specimens from India therefore, *Anser f. brachyrhynchus* must be deleted from the Indian list and Baker's record of '*neglectus*' from Assam treated with cautious disbelief !]

79. Whitefronted Goose. *Anser albifrons albifrons* (Scopoli)

Branta albifrons Scopoli, 1789, Annus I, Hist. Nat.: 69 (North Italy)

Baker, FBI No. 2253, Vol. 6 : 399

Plate 8, fig. 2, facing p. 160

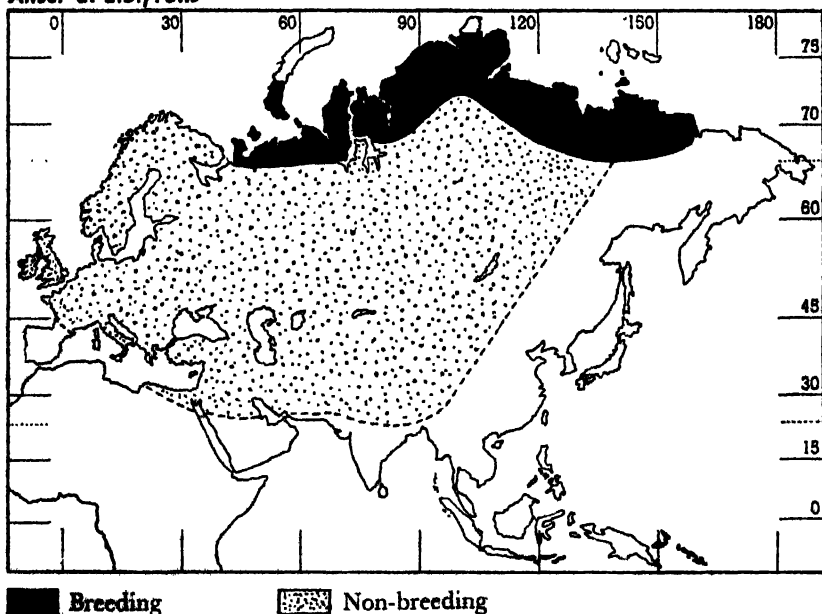
LOCAL NAMES. Unrecorded.

SIZE. Greylag Goose —; length *c.* 68 cm. (27 in.).

FIELD CHARACTERS. Darker and considerably smaller and daintier than the Greylag, with a much shorter (pinkish) bill. A diagnostic white patch on forehead (from base of bill), and irregular coarse black barring on lower breast and flanks. Rump dark greyish brown *contra* grey in Greylag. Legs orange. Sexes alike.

STATUS, DISTRIBUTION and HABITAT. Sparse and rare winter visitor to West Pakistan, NW. India (including Kutch and Rajasthan¹, and across the Gangetic Plain (U.P.) to Assam and Manipur). Southernmost record in India from Chilka lake, Orissa, *c.* 19°40'N. (Craven, JBNHS 48: 365-6).

Anser a. albifrons



Extralimital. Breeds on the Arctic coasts of Europe and Asia, east from the Kanin Peninsula, Kolguev, and southern Novaya Zemlya to the Kolyma river and perhaps beyond. Winters in W. Europe, shores of the Mediterranean, Black, and Caspian seas to China and Japan (Peter Scott). Also in N. Iraq (C. D. W. Savage).

GENERAL HABITS. On the whole very similar to the Greylag. Has a reputation for ability to rise almost vertically from the ground on sudden alarm or disturbance, and to get out of gunshot faster than any other goose.

VOICE. Described as a high-pitched musical disyllabic honking, whence known as 'Laughing Goose' in many countries.

MUSEUM DIAGNOSIS. For full description of plumages etc. see Witherby 1939, 3: 188.

¹ The bird shot in Bikaner in December 1948 and recorded (JBNHS 46: 196-7) as *Anser fabalis brachyrhynchus*, proves on re-examination to be an immature of this species.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♂	392-442	43-52	60-71	114-132 mm.
♀ ♀	380-421	43-47	—	—

Extremes for European birds:

♂ ♀	369-450	40-55 (nail 8-15)	55-80	— mm.
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Weight c. 2 - 3 kg.

(Witherby)

COLOURS OF BARE PARTS. Iris brown. Bill flesh colour or pale orange-yellow to rosy flesh colour, the nail paler and whiter. Legs and feet reddish flesh colour to orange-yellow, the webs paler; claws whitish (Baker).

80. **Lesser Whitefronted or Dwarf Goose.** *Anser erythropus* (Linnaeus)

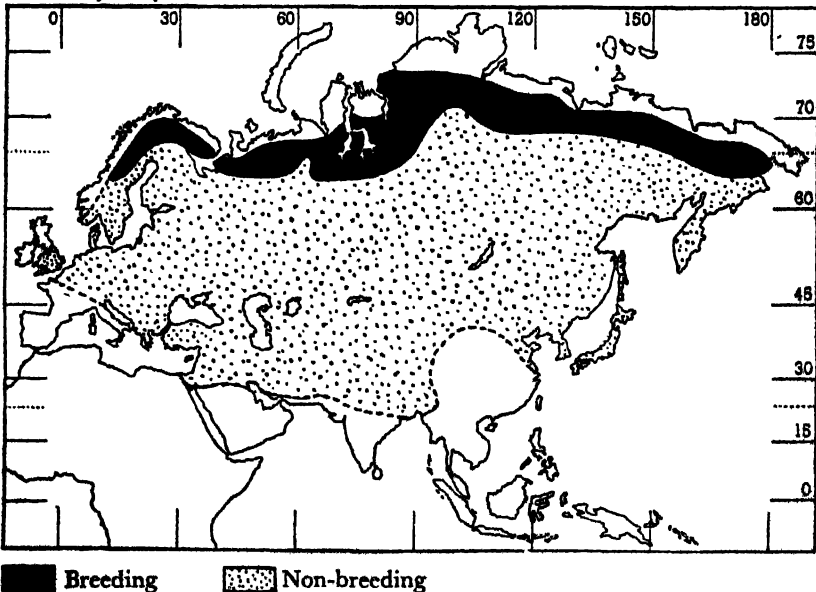
Anas erythropus Linnaeus, 1758, Syst. Nat., ed. 10, 1: 123 (North Sweden)
Baker, FBI No. 2254, Vol. 6: 401

LOCAL NAMES. Unrecorded.

SIZE. Duck \pm ; c. 53 cm. (21 in.).

FIELD CHARACTERS. Like the Whitefronted, *A. albifrons*, but considerably smaller, dark brown, also with blotchy black bars on lower breast and belly, with a round shaped head and proportionately much shorter pink bill. The more extensive white forehead patch, reaching to top of head between the eyes, and the conspicuous swollen ring of yellow skin around

Anser erythropus



the eye are diagnostic features which, on a satisfactory view, should settle all doubt. Sexes alike.

STATUS, DISTRIBUTION and HABITAT. Rare and sparse winter visitor. Recorded sporadically from West Pakistan (Sind, the former NWFP), Kashmir, Uttar Pradesh, Bengal, Bihar, and Assam. Has strayed as far south as Maharashtra, Poona district (Trevenen, JBNHS 28: 1081).

Extralimital. Breeds largely on mountain tarns from Norwegian Lapland to the Kolyma in Siberia, and perhaps further eastwards. Winters in south-eastern Europe, Black and Caspian seas, Middle East (Iraq, Iran), Seistan, Turkestan, China and Japan.

GENERAL HABITS. Usually congregates in large flocks in its regular winter quarters, e.g. around the Caspian and in northern Iraq. In India recorded only in twos and threes, separately or mixed up with flocks of Greylags.

VOICE. Described as resembling that of *A. albifrons* but much higher pitched and more squeaky.

MUSEUM DIAGNOSIS. In the hand an additional point for differentiation from *albifrons* is that the 'teeth' or serrations are concealed when the bill is shut. For details of plumages etc. see Witherby 1939, 3: 192.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	367-388	28-35	58-62	95-109 mm.
♀♀	352-381	32-35	—	—
				(Witherby)

Extremes

	Wing	Bill	
♂♀	340-390	30-45	(J. Berry in Witherby)

COLOURS OF BARE PARTS. Iris brown. Bill pink. Legs orange-yellow (Delacour).

81. Eastern Greylag Goose. *Anser anser rubrirostris* Swinhoe

Anser cinereus var. *rubrirostris* Swinhoe, 1871, P.Z.S.: 416, ex Gray, 1846, Cat. Bds.

Nepal, 144, nom. nud., ex Hodgson, 1844, Zool. Misc.: 86, nom. nud. (Shanghai)

Baker, FBI No. 2252, Vol. 6: 398

Plate 4, fig. 4, facing p. 64

LOCAL NAMES. *Sona*, *Karria sona*, *Hāns*, *Rāj hāns* (Hindi); *Rāj hāns* (Bengal); *Kāj* (Bihar); *Kallaik*, *Khar hāns* (Bhagalpur); *Mogūla*, *Mogūla bātūk* (Nepal terai); *Kāng ngā* (Manipur); *Rāj hāns*, *Dhitraj* (Assam); *Gāj* (Kutch); *Hāj* (Sind).

SIZE. Domestic Goose \pm ; length c. 81 cm. (32 in.).

FIELD CHARACTERS. Very like the normal ashy brown phase of the domestic goose. Pale or French grey rump, white upper tail-coverts, and white nail to pink bill diagnostic.

In flight the comparatively pale head, and pale grey leading-edge of the wing next the body, are additional pointers. Sexes alike.

STATUS, DISTRIBUTION and HABITAT. Winter visitor. Common in West Pakistan (Sind, the former NWFP), Kashmir¹, Punjab, in small numbers in

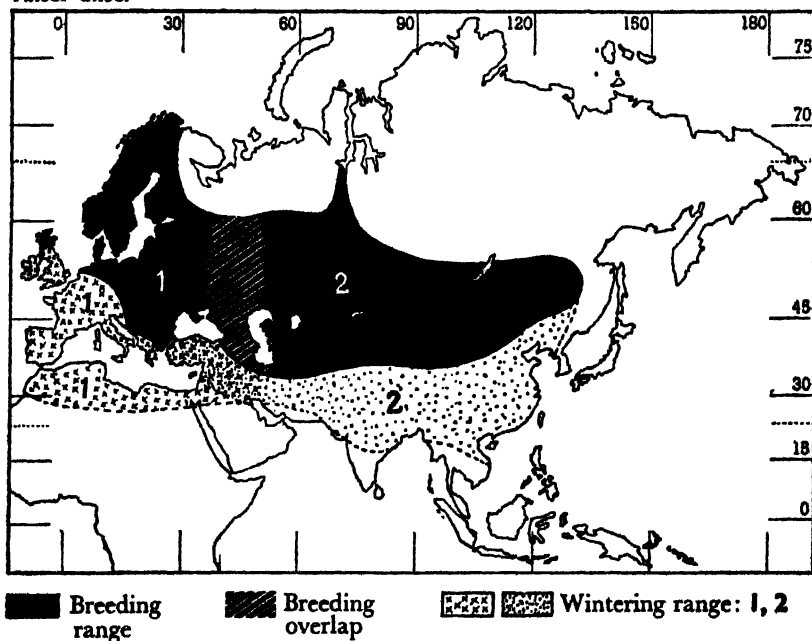
¹ A white goose shot by Col. H. Nedou and published (JBNHS 49: 311) as the first record in India of the Snow Goose, *Anser caerulescens*, was wrongly identified. It proves to be a partial albino Greylag.

Rajasthan, N. Gujarat, Nepal terai, and across the Gangetic Plain to Assam, Manipur (abundant on Logtak lake), and East Pakistan. Abundant on the Chilka lake, Orissa, in some winters. Rare in Madhya Pradesh; virtually absent in the Deccan and S. India. Only once in Ceylon.

Extralimital. Breeds eastwards from c. 40°E. and south of 60°N., through Asia Minor and central Asia to Kamchatka. In winter to the eastern Mediterranean, Black and Caspian seas, and in Seistan and China (Peter Scott).

MIGRATION. Little precise data. Normally arrives in large skeins (from central Asia?) through the NWFP and Kashmir in October/November, (sometimes as early as first half September) spreading out by December. Has been observed migrating (this and/or Barheaded Goose) at over 4,270 m. (14,000 ft) alt. across the Himalayas in this sector. Practically all have left by end March.

Anser anser



1 *A. a. anser*; 2 *A. a. rubrirostris*

GENERAL HABITS. Highly gregarious. Congregates in considerable flocks on the larger jheels particularly in the north-west (e.g. Manchar and Haigam lakes in Sind and Kashmir) wherever abundance of food, comparative freedom from molestation, and extensive cultivation of winter crops in the surroundings supply the essential requirements. Family parties or larger gaggles spend the daytime squatting belly to ground or resting on one leg on mud-spits in jheels and rivers or amidst open fields, or floating listlessly on the water with head tucked in the feathers of the back. But the birds are always uncannily vigilant and alert and can seldom be taken unawares. They

fly out to their accustomed feeding-grounds in the evenings and are active more or less throughout the night — sometimes till well after sunrise. The feeding is done by grazing in wet meadows or newly sown fields; also in the water while swimming by submerging the head and up-ending like ducks. Flight swift and strong with regular wing-beats either in the characteristic V-formation or in trailing wavy ribbons; usually the former in migration. Flocks occasionally indulge in spectacular aerobatics — plunging, side-slipping, turning over on back (the 'Immelmann Turn') and nose-diving high up in the air as if to escape some imaginary devil in pursuit, apparently purely for fun.

FOOD. Almost exclusively vegetarian. Whilst with us, grass and shoots of winter crops such as wheat and gram (to which they may do considerable local damage) and paddy left over in the stubbles after harvesting; also aquatic weeds and tubers etc. *Singhāra* (water-chestnuts = *Trapa*) in the Kashmir lakes form the staple diet in season.

VOCAL. A nasal conversational *gag-gag-gag* while feeding. The far-reaching honking *aahng-ung-ung*, with its variants, uttered in different keys during the morning and evening flighting, is one of the most exhilarating bird sounds for the sportsman and bird lover. These calls are also uttered when migrating, especially during the night.

BREEDING (including display etc.) see Witherby 1939, 3:182-3 for the Western race.

MUSEUM DIAGNOSIS. Distinguished from the Western (nominate) race, *A. a. anser* by its distinctly lighter and greyer colour, and *pink* instead of orange bill. No significant size difference.

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂ ♂	445-482	55-72	73-82	129-150 mm.
♀ ♀	416-470	54-70	52-70	125-145 mm.

— (Delacour, for *A. a. anser*)

Weight (100 weighed by Hume) 2.72 kg. (♀) to 3.86 kg. (♂)

COLOURS OF BARE PARTS. Iris brown. Bill fleshy white to pink; nail paler and whiter. Legs and feet pink.

82. Barheaded Goose. *Anser indicus* (Latham)

Anas indicus Latham, 1790, Index Orn., 2: 839 (Taimyr = India *vide* Ticehurst 1930, JBNHS 34: 489)

Baker, FBI No. 2258, Vol. 6: 405

Plate 4, fig. 6, facing p. 64

LOCAL NAMES. *Hāns*, *Kāreyee hāns*, *Rāj hāns*, *Birwa*, *Sawān* (Hindi); *Bādi hāns* (Bengal, Chittagong); *Kārhānch*, *Mōgli* (Mirshikars, Bihar); *Girwa*, *Paria* (Nepal); *Nāngpa* (Ladakh); *Neer vathoo* (Coimbatore); *Bornooria hāns*, *Boga rājhāns* (Assam); *Kāng ngā* (Manipur).

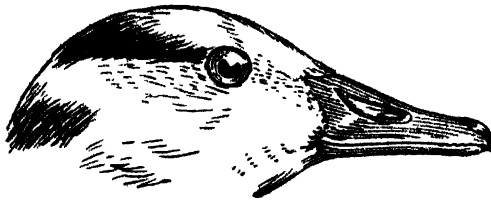
SIZE. Greylag Goose —; length *c.* 75 cm. (30 in.).

FIELD CHARACTERS. A slender, pale grey, brown, and white goose.

Adult. Head, face, throat, chin, and a conspicuous stripe down each side of brown neck, white. A black bar across sinciput from eye to eye,

and a shorter second one below it across nape, diagnostic. Bill and legs yellow, nail at bill-tip black. Sexes alike.

In flight white head, pale body and black wing-quills are leading pointers.



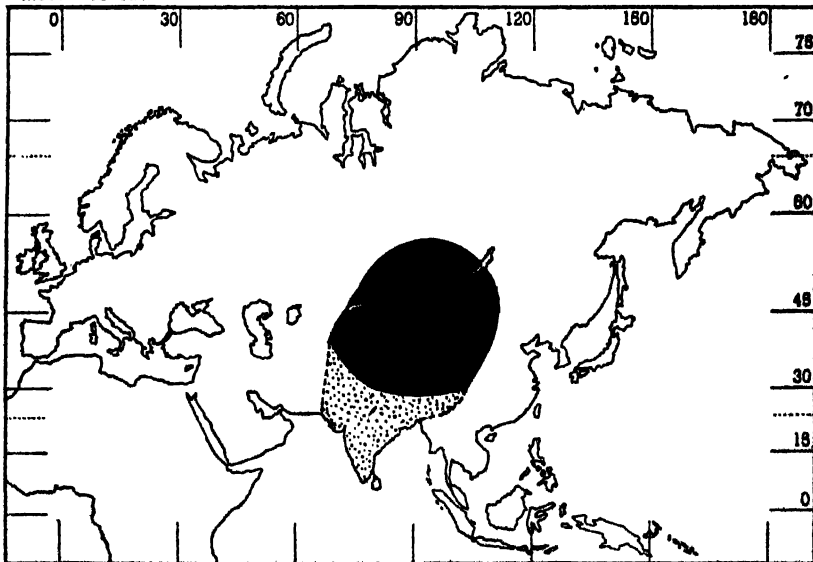
× c. ½

Young (immature). Like adult but paler. Head and neck pale grey without markings. Hindcrown, hindneck, and a line through the eyes dusky brown. Bill and feet greenish yellow.

STATUS, DISTRIBUTION and HABITAT. Breeds in Ladakh ; elsewhere winter visitor. Common throughout the northern portions, from West Pakistan and Kashmir eastward through the Punjab, Rajasthan and the Gangetic Plain (including Nepal terai) to Assam and East Pakistan. In some years abundant on the Chilka lake in Orissa. Rare in Gujarat and Deccan, but leap-frogging as far south as Mysore in small numbers fairly regularly. Does not reach Ceylon. Affects large jheels and rivers.

Extralimital. Breeds on high elevation lakes in central Asia from the Tien Shan to Kokonor. Winters sparingly also in Burma.

Anser indicus



■ Breeding ▨ Non-breeding

MIGRATION. Little known beyond that it normally arrives in northern West Pakistan and NW. India about October/November, is well in by

mid-December, and mostly gone by end March during which month thousands reported migrating northward over lower reaches of Karnali river in Nepal (R. G. M. Willan, *in epist.*). Two birds (1 juvenile, 1 adult), ringed in Kirghiz SSR (c. 40°–42°N., 75°E.) in the breeding season, were recovered in subsequent winters near Gilgit (c. 36°N., 74°E.) and in Dera Ghazi Khan district, W. Pakistan (c. 30°N., 71°E.) respectively. (Details in JBNHS 58: 284, 1961; 59: 964, 1962.) For migration over High Himalayas in NW. sector see under Greylag.

GENERAL HABITS. Gregarious; family parties of 5 or 6 and gaggles of up to a hundred or more. Not appreciably different from the Greylag except that it keeps more to the larger rivers whose expansive sandbars afford safe daytime refuge to vast resting congregations. Also largely a crepuscular and nocturnal feeder, often causing considerable local damage to winter crops. Extremely wary and difficult to approach while in its winter quarters where commonly hunted, but astonishingly tame and confiding where unmolested, e.g. on its breeding grounds in Tibet — at least was (c. 1945) before the Chinese marched in.

VOICE. Similar to the Greylag's but more nasal and musical.

FOOD. Almost exclusively vegetarian: grass, tubers, tender shoots of wheat, gram, and other winter crops. Also paddy in stubbles.

BREEDING. Within our limits only Ladakh, on the high plateau lakes at c. 4300 metres elevation, e.g. Pangong Tso, Tso Moriri, and Tsokr. *Season*, mainly end May and June. *Nest*, a slight depression in the ground thickly padded with down which is banked up in a parapet around it. On grassy islets in the lakes, or on inaccessible spongy humps in the surrounding bogs — often many nests close to one another. At Tsokr, B. B. Osmaston found them breeding also on cliffs in situations normally used by the Brahminy Duck (q.v.); once in a disused raven's nest padded with down. *Eggs*, 3 to 6, commonly the latter; thick-shelled, ivory white, becoming soiled during incubation by the owner's muddy feet. Average size of 100 eggs 84.4 × 55.1 mm. (Baker). Incubation by female alone. Period 28–30 days (Delacour). Gander very solicitous about safety of young, the two parents flanking the chicks on either side when leading them on land or on water — the brood occasionally strung out like a furry tail behind flank of swimming parent.

MUSEUM DIAGNOSIS

Chick (in down). *Above*, pale greyish brown with yellow patches on wings. Head and neck yellow, with a grey patch on occiput. *Below*, pale yellow. Bill bluish grey with fleshy nail. Legs greenish grey. [See Delacour 1954, 1: 192 (plate).]

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂♂	450–482	48–63	70–80	140–170 mm.
♀♀	406–460	47–55	63–75	127–160 mm.

COLOURS OF BARE PARTS. Iris brown. Bill yellow with black nail and nostrils. Legs and feet deep yellow (Delacour).

[*Synopsis* (p. 27) includes the Lesser Snow Goose or Blue Goose, *Anser caerulescens caerulescens* (Linnaeus) in the Indian avifauna on the strength

of a record published in the Journal of the Bombay Natural History Society (49: 311-12) of a white goose, then so identified, shot on Haigam jheel, Kashmir, in February 1950 — a single bird with a party of Greylags. On a re-examination of the specimen in the BNHS collection by Mr Humayun Abdulali and one of us (SDR) it proves to be a partial albino of *Anser anser* (JBNHS 63(1): 198). This leaves us without any record of the Snow Goose in our area, and the species must therefore be expunged from the Indian list.]

Genus CYGNUS Bechstein

Cygnus Bechstein, 1803, Orn. Taschenb., 2: 404, note. Type, by monotypy, *Anas olor* Gmelin

Characterized by very long neck. Bill of moderate size, raised at the base, of nearly equal breadth throughout. Nostrils elliptical, placed very far back. Wing long; 1st primary (as.) about half length of 2nd; 2nd and 3rd subequal and longest. Tail short, well rounded. For further details see Delacour 1954, 1: 57.

Key to the Species

		Page
A	Lores and triangular patch between forehead and gape black. A knob at base of bill in adults.....	<i>C. olor</i> 137
B	Lores and triangular patch between forehead and gape yellow or orange-yellow, never black. Knob at base of bill lacking.....	1
1	Yellow on bill extending up to or beyond nostril towards tip of bill.....	<i>C. cygnus</i> 136
	Yellow never reaching nostril and generally confined to somewhat circular patch on base.....	<i>C. columbianus</i> 134

CYGNUS COLUMBIANUS (Ord)

Key to the Subspecies

Bill shorter (87-96 mm.), not so broad but comparatively high at base. Serrations visible along edge of bill when closed.....
*C. c. bewickii*
 Bill longer (94-99 mm.), broader but less high at the base in comparison. Serrations hardly visible when bill closed.....*C. c. jankowskii*

84. **Bewick's or Western Whistling Swan.** *Cygnus columbianus bewickii* Yarrell

Cygnus bewickii Yarrell, 1850, Trans. Linn. Soc. London, 16: 453
 (Yarmouth, England)

Baker, FBI No. 2244, Vol. 6: 381

85. **Jankowski's or Eastern Whistling Swan.** *Cygnus columbianus jankowskii* Alphéraky

Cygnus bewickii jankowskii Alphéraky, 1904, Priroda i Okhota, Sep.: 10 (Ussuriland).

In Russian, cf. Buturlin 1907, Ibis: 651

Baker, FBI No. 2245, Vol. 6: 382 (= *C. minor*)

Plate 8, fig. 3, facing p. 160

LOCAL NAMES. Unrecorded.

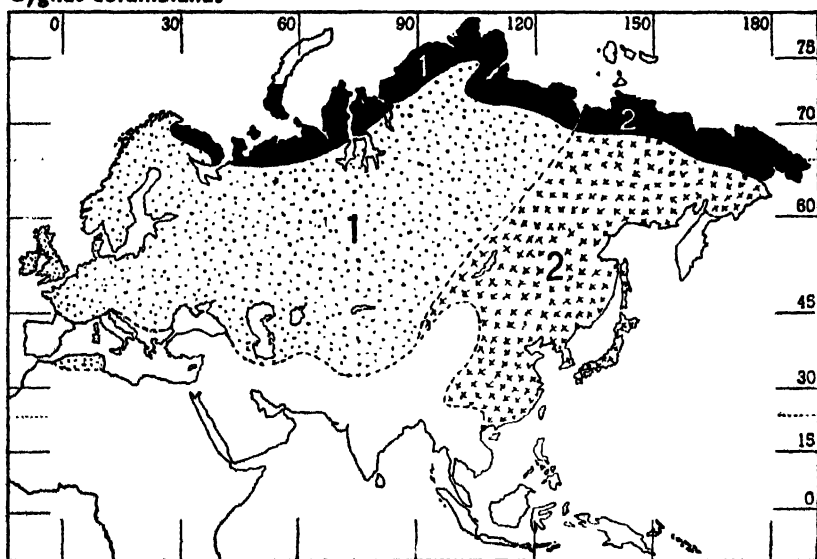
SIZE. Vulture +; length c. 122 cm. (48 in.) of which neck c. 60 cm.

FIELD CHARACTERS. Large, all-white, goose-like, but with much longer and proportionately slenderer neck. A conspicuous yellow patch of variable extent on base of bill (lores) more or less abruptly truncated *behind* nostril. Terminal portion of bill black. Sexes alike.

STATUS, DISTRIBUTION and HABITAT. Very rare straggler in severe winters. Only five specimens appear to have been taken within our limits at irregular intervals during the present century — one each in Baluchistan (Khushdil Khan), Sind, NWFP (Attock dist.), and near Delhi, all in December, the fifth and latest in Kutch (Bhuj) in February (JBNHS 47: 167). No racial identification is available for the previous specimens, but the Kutch bird fits the characters of *jankowskii*. However, the eastern and western races intergrade, and the distinctness of *jankowskii* is currently doubted.

Extralimital. *C. c. bewickii* breeds in northern Russia from the Kanin peninsula and N. Siberia east to the Lena delta. In winter south to British Isles, N. Europe, Caspian Sea, and central Asia.

Cygnus columbianus



■ Breeding range

■ Wintering range: 1, 2

1 *C. c. bewickii*; 2 *C. c. jankowskii*

C. c. jankowskii breeds from the delta of the Lena to the delta of the Kolyma. In winter south to China and Japan.

GENERAL HABITS. This and other swans have been recorded in India singly, in pairs, or small herds, keeping to the larger rivers and open waters. They swim buoyantly, rather high on the water, and feed mostly on aquatic vegetation, submerging their head and neck in the quest and frequently up-ending like ducks to reach the lower levels. Sometimes dives for food like all other swans. They require effort to take off from the water, running some distance along the surface with powerful flaps of the broad wings, but are fast and graceful once properly airborne, flying considerable distances on migration.

MUSEUM DIAGNOSIS. For plumages and other details see Witherby 1939, 3: 174. The eastern race *C. c. jankowskii* is described as differing from *bewickii* only by its larger bill which is longer (94–99 mm. *v.* 87–96), broader near the tip (32–36 mm. *v.* 29–32), and higher near the base. Its yellow loreal patch extends a little further towards the nostril and is not so abruptly truncated. No size or other difference.

MEASUREMENTS (of *C. c. bewickii*)

	Wing	Bill (from feathers)	Middle toe with claw	Tail
♂ ♀	480–560	87–96	115–128	140–175 mm. (Hartert)

The Kutch specimen (♂?) measured in the flesh:

	552	99	140	161 mm.
Tarsus	112 mm.			(SA)

COLOURS OF BARE PARTS. Iris brown. Bill black and yellow (see Field Characters). Legs and feet black.

86. Whooper Swan. *Cygnus cygnus* (Linnaeus)

Anas cygnus Linnaeus, 1758, Syst. Nat., ed. 10, 1: 122 (Sweden)
Baker, FBI No. 2243, Vol. 6: 380

LOCAL NAMES. Unrecorded.

SIZE. Vulture +; length *c.* 152 cm. (60 in.) of which neck *c.* 76 cm.

FIELD CHARACTERS. Very large, pure white, goose-like, but with a markedly straight and upright carriage of long neck when swimming. Bill longer than in other swans, with the upper outline running straight from tip to base of forehead. 'Tip of bill black, base and lores yellow, this colour extending forward laterally to the nostrils' (Delacour). Sexes alike; female slightly smaller.

STATUS, DISTRIBUTION AND HABITAT. Very rare straggler in severe winters. Less than a dozen occurrences recorded within our limits sporadically: one in Nepal in 1829, the others in the present century in NWF Province (Peshawar dist.), Kashmir, Punjab, Sind and Rajasthan. Latest record of three birds on Chenab river at Timmu (Jhang district, W. Pakistan), December 1953 by Nasiruddin Khan (C. D. W. Savage). On large rivers and open dhands or jheels.

MUSEUM DIAGNOSIS. For plumages and other details see Witherby 1939, 3: 168-72; Delacour 1954, 1: 72-5.

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂♂	560-630	100-112	112-120	160-200 mm.
♀♀	550-600	95-103	110-118	155-180 mm.
				(Delacour)

Weight of adults: ♂ *c.* 7-12 kg.; ♀ *c.* 6-10 kg.

COLOURS OF BARE PARTS. Iris brown. Bill: base and lores yellow, tip black (see Field Characters). Legs and feet black.

87. **Mute Swan.** *Cygnus olor* (Gmelin)

Anas olor Gmelin, 1789, Syst. Nat., 1: 502 (Russia)

Baker FBI No. 2246, Vol. 6: 383

LOCAL NAMES. Unrecorded.

SIZE. Vulture +; length *c.* 152 cm. (60 in.) of which neck *c.* 76 cm.

FIELD CHARACTERS. As large as Whooper Swan, also pure white. Easily identified by a prominent black knob on forehead at base of rather long and pointed pinkish orange bill. Slender neck carried in a graceful S-shaped curve. Sexes alike; female slightly smaller.

In subadult birds, as have mostly occurred in our area, traces of the pale grey-brown juvenile plumage persist. The knob is absent or only slightly developed; the feathers of the forehead prolonged to a point.

STATUS, DISTRIBUTION and HABITAT. Very rare straggler in severe winters. About a dozen specimens in all have been taken within our limits sporadically during the last hundred years (the last in 1911), chiefly in West Pakistan — N. Baluchistan, Sind, the former NW. Frontier Province, and Punjab. Most records are from the Indus and the Punjab rivers, and from Khushdil Khan lake near Quetta, and the Manchar and other large duck-shooting dhands or jheels in Sind. Sight record of a single bird from as far south as the Bombay Deccan, near Poona (Trevenen 1922, JBNHS 29: 287).

GENERAL HABITS, FOOD, etc. See under *C. c. bewickii*. When angry this species assumes the characteristic aggressive posture, commonly depicted in pictures, drawing in the neck and arching the wings over the back.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from knob)	Tarsus	Tail
♂♂	560-625	70-85	100-120	190-200 mm.
♀♀	537-570			
				(Delacour)

Weight *c.* 6-11 kg.

COLOURS OF BARE PARTS. Iris dark brown. Lores black. Bill: upper mandible reddish horny, the knob, base, nostrils, margins, and nail black; lower mandible wholly black. Legs and feet dull black.

Genus *DENDROCYGNA* Swainson

Dendrocygna Swainson, 1837, *Classif. Bds.*, 2: 365. Type, by subsequent designation, *Anas arcuata* Horsfield

Bill of moderate size, raised at base and of nearly equal width throughout. Nail prominent and abruptly bent down. Nostrils situated about one-third length of bill from base. Wings rather broad and rounded. Tarsus long and stout, reticulated on lower portion in front. Legs placed more forward than in most Anatidae. Feet large.

The genus is represented almost throughout the tropical world, two species being found in the Indian subcontinent. (For further details see Delacour, loc. cit., 1: 27-34.)

Key to the Species

Upper tail-coverts uniformly chestnut.....*D. javanica*
Upper tail-coverts whitish, sometimes marked with black..*D. bicolor*

88. **Lesser Whistling Teal or Tree Duck.** *Dendrocygna javanica*
(Horsfield)

Anas javanica Horsfield, 1821, *Trans. Linn. Soc. London*, 13: 199, pl. 1 (Java)
Baker, FBI No. 2260, Vol. 6: 411

Plate 4, fig. 5, facing p. 64 and Plate 7, fig. 3, facing p. 144

LOCAL NAMES. *Seelhi*, *Seelkahi* (Hindi); *Sharāl* ♂, *Sharāli* ♀ (Bengal); *Hansrali* (Orissa); *Sorali*, *Horali* (Assam); *Tingi* (Manipur); *Bongfang daophlantu* (Cachar); *Yeranda* (Malayalam); *Chilli thārā* (Tamil, Ceylon); *Sēruwā*, *Thumba sēruwā* (Sinhala); *Nāni sisoti* (Gujarat); *Chiku* (Sind); *Chayi* (Kutch).

SIZE. Domestic duck —; length c. 42 cm. (17 in.).

FIELD CHARACTERS. A small pale brown and maroon-chestnut coloured duck, confusable with no other of the same size except the Large Whistling Teal. Uniformly chestnut upper tail-coverts distinguish it from the latter, in which they are creamy white. Feeble, flapping rail-like flight, and the shrill wheezy whistling notes constantly uttered on the wing are leading clues to its identity. Sexes alike.

Young (immature). Duller coloured. Mantle feathers margined with dingy fulvous instead of golden rufous. Lower plumage pale dull fulvous brown.

STATUS, DISTRIBUTION and HABITAT. Resident; moving about locally with drought and flood. Also partial local migrant. All India, Andaman and Nicobar islands, both Pakistans, Nepal (terai), Ceylon. Affects reedy and vegetation-covered tanks and jheels in plains country.

Extralimital. Burma eastwards to coast of S. China, Malaysia, Thailand, S. Viet Nam, Ryukyu Is., SW. Borneo, Sumatra, Java.

GENERAL HABITS. Sociable. Keeps in small parties of 10 to 15, occasionally fairly large flocks, on and around weedy tanks and inundated paddy-fields. Perches freely in the surrounding trees. Avoids open water and large rivers. Mainly a nocturnal feeder, seeking safety during daytime on undisturbed lotus-covered village tanks, or on the open sea just beyond

the surf, or backwater lagoons (in coastal areas), fighting at sunset to forage in nearby paddyfields. A remarkable refuge of this type in the Calcutta area is the open duck pond in Alipore Zoo, where hundreds of wild birds congregate every morning to spend the day throughout the winter months, year after year. Flight feeble, flapping reminiscent of a jaçana's. The birds keep wheeling over a tank long after the better sporting ducks have departed as a result of gunfire. They are poor eating and seldom shot by sportsmen.

It is a good diver and also walks well on marshy land, grazing rather like a goose.

VOICE and CALLS. A shrill wheezy whistling *seasick*, *seasick* constantly uttered on the wing.

FOOD. Largely vegetarian — aquatic weeds and tender shoots and grain of wild and cultivated rice etc. Also small fish, frogs, snails, worms.

BREEDING. *Season* overall June to October varying locally with early or late monsoon and resulting water conditions; in Ceylon chiefly December-January and July-August. *Nest*, of twigs and grass placed in natural hollows in ancient tree-trunks, or built at moderate heights in the fork of large branches, sometimes well away from water. Old nests of kites, herons and crows frequently utilized. Some nests built on the ground among reeds and scrub bordering a tank or jheel — fairly substantial pads of leaves, rushes, and grass. Unlined with down, but occasionally with a few odd feathers. *Eggs*, 7 to 12 (maximum recorded 17) — commonly 10, ivory white, smooth, becoming stained brownish during incubation. Average size of 100 eggs 46.9×36.8 mm. (Baker). Both sexes said to incubate. Period of incubation 22 to 24 days (Baker); 'probably 30 days' (Delacour).

MUSEUM DIAGNOSIS. Distinguished from *D. fulva* by smaller size and by uniformly chestnut upper tail-coverts *contra* creamy white.

Chick (in down). 'Blackish brown and whitish grey, with large [white] spots on back' (Delacour).

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂ ♀	170-204	38-42	40-50	53-55 mm. (Delacour)

Weight *c.* 450-600 gm.

COLOURS OF BARE PARTS. Iris dark brown. Bill slaty grey to almost black, the nail still darker. Eyelids bright yellow. Legs and feet plumbeous-grey or plumbeous-blue; webs and claws blackish.

89. Large Whistling Teal. *Dendrocygna bicolor* (Vicillot)

Anas bicolor Vieillot, 1816, Nouv. Dict. Nat. Hist., 5: 136 (Paraguay)

Baker, FBI No. 2261, Vol. 6: 413

Plate 4, fig. 8, facing p. 64

LOCAL NAME. *Baddā sharāl* (Bengal).

SIZE. Domestic duck —; length *c.* 51 cm. (20 in.).

FIELD CHARACTERS. Similar to the Lesser Whistling Teal; ferruginous, brownish black, cinnamon, and chestnut. Distinguished from it by somewhat larger size, *creamy white* (*contra* chestnut) upper tail-coverts, a black

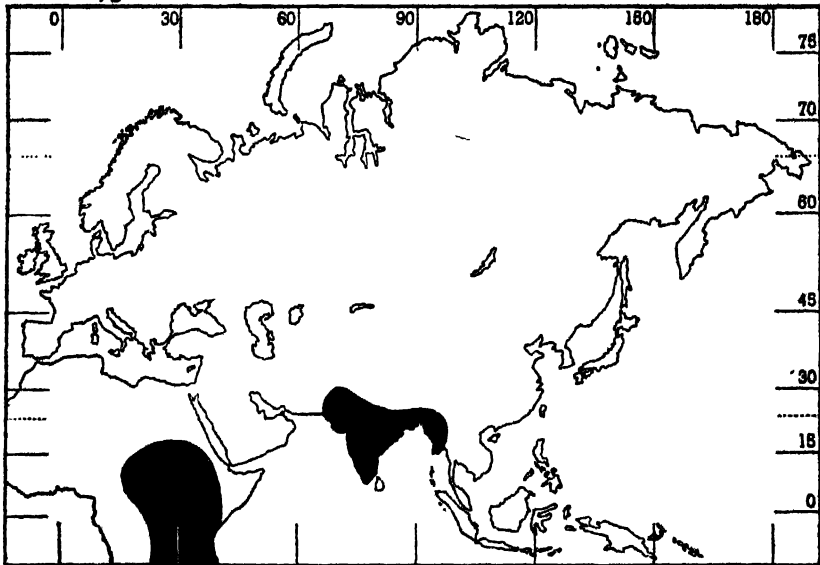
line down back of neck, and a broad, diffuse rusty-whitish collar round middle of foreneck. Sexes alike.

Young (immature). Duller; the chestnut portions more brown.

STATUS, DISTRIBUTION and HABITAT. Resident, nomadic, and possibly also local migrant in part. Scattered widely but sporadically in many areas; everywhere rather scarce and much less common than *D. javanica*. Both Pakistans, N. India south to the Deccan, Assam, Manipur; Ceylon (rare vagrant). Frequents reedy and vegetation-covered jheels and tanks in plains country.

Extralimital. Range very remarkable: far flung, discontinuous and fragmentary, yet producing no geographical variation. S. California, Mexico, northern tropical S. America, Brazil, Peru, south to Paraguay and N. Argentina. East Africa from Lake Chad to Natal; Madagascar. In Asia, besides the Indian subcontinent and Ceylon, only Burma south to Pegu.

Dendrocygna bicolor



■ Residential range (Also Madagascar and Central & South America)

GENERAL HABITS. Keeps in smaller flocks and to rather more secluded weed-covered tanks, but on the whole very similar to *D. javanicus* with which it is often found in association. Wilder and faster on the wing.

VOICE. Also similar, but said to be shriller.

BREEDING. Apparently more common in Bengal (Nadia dist.) and East Pakistan (Khulna and Jessore districts) than elsewhere in our limits. *Season*, June to October, chiefly July-August. *Nest*, of sticks roughly put together in hollows in ancient tree-trunks or in forks of large branches, at moderate heights. Very like that of Lesser Whistling Teal; likewise appropriates disused nests of kites and crows. Occasionally built on ground among rank vegetation at edge of a tank. *Eggs*, 6-8, ivory white, smooth, like those of the preceding species only somewhat larger. Average size of 50 eggs

56.6 × 42.9 mm. (Baker). Share of the sexes in incubation unrecorded. Incubation period 30–32 days (Delacour).

MUSEUM DIAGNOSIS. For description of plumage see Baker, loc. cit.

Chick (in down). Pale greyish brown; white markings as in *D. javanicus* less contrasty.

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂ ♀	200–235	42–52	56–61	52–58 mm. (Delacour)

Females slightly smaller than males.

Weight ♂ c. 650–900 gm., ♀ c. 450–730 gm.

COLOURS OF BARE PARTS. Iris light to dark brown. Bill dusky black with bluish slate of varying extent at base. Legs and feet pale dusky plumbeous or bluish slate, to nearly black. Claws black.

Genus TADORNA von Oken

Tadorna L. von Oken, 1817, Isis, 1: 1183. Type, by tautonymy, *Anas tadorna* Linnaeus *Casarca* Bonaparte, 1838, Geogr. and Comp. List: 56. Type, by monotypy and tautonymy, *Anas rutila* Pallas = *A. ferruginea* Pallas

Goose-like in shape and habits. Bill short, high at base, concave above, flattened and turned up at tip. Nail small and abruptly turned downward and inward, thus bill more or less hooked at tip. Nostrils less than one-third length of bill from base. Tarsus scutellated in front near foot. Wings long and pointed. Tail rounded, of fourteen feathers. Sexes more or less alike.

Two species occur in our limits, formerly placed under separate genera.

Key to the Species

Chestnut-coloured above and below, head paler chestnut, large white patch on bend of wing, bill black..... *T. ferruginea*

Black and white above and below, head black, chestnut girdle around breast and shoulders, bill red..... *T. tadorna*

90. Ruddy Shelduck or Brahminy Duck. *Tadorna ferruginea* (Pallas)

Anas (ferruginea) Pallas, 1764, in Vroeg, Cat. d'Ois., Adumbr.: 5 (Tartary)

Baker, FBI No. 2263, Vol. 6: 416

Plate 4, fig. 7, facing p. 64

LOCAL NAMES. *Chākwa* ♂, *Chākwi* ♀, *Sūrkhāb*, *Lāl* (Hindi); *Mungh*, *Lālo*, *Kwancha*, *Kathiun* (Sind); *Chākā-chāki* (Bengal); *Rāmkaon*, *Chūkoi-chākoua* (Assam); *Kēsār pāndia*, *Pānda hansa* (Orissa); *Sarza*, *Chakrawak* (Marathi); *Bāpānā chiluwā* (Telugu); *Thāwā* (Tamil); *Loku sēruvā* (Sinhala).

SIZE. Large domestic duck; length c. 66 cm. (26 in.).

FIELD CHARACTERS. A large orange-brown or cinnamon-brown duck with paler head and neck, a prominent metallic green speculum on wing with a white patch (wing-coverts) in front of it, and black wings and tail.

In overhead flight orange-brown body, white underside of wings and black quills (remiges) diagnostic.

Male, with narrow black collar or ring round base of neck in breeding season; obsolete in winter.

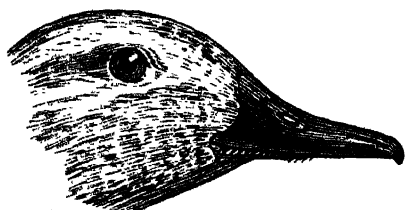
Female, similar but with head paler and whitish and no black collar.

Young (immature). Like female but with a grey wash on scapulars and tertiaries.

STATUS, DISTRIBUTION and HABITAT. Winter visitor (breeding in our area only in Ladakh). All India (rare or absent in the south), both Pakistans, Nepal (possibly breeding), Ceylon (occasional). Affects large open lakes and rivers with shingle banks and mudspits.

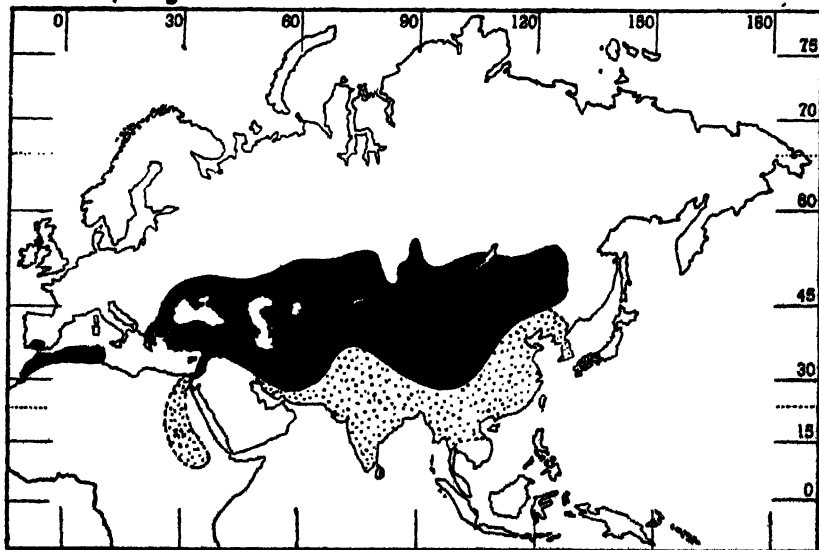
Extralimital. Breeds in S. Spain and from SE. Europe, Near East, Caspian Sea, across Asia to Transbaikalia, south to Himalayas and SW. China. [Also in SE. Iran and Seistan.] Winters in southern half of its breeding range to the Nile Valley; India and S. China. Occasional in Britain (Peter Scott).

MIGRATION. Arrives in N. India c. October/November; most have departed by mid-April. A juvenile ringed in Kirghiz SSR (c. 42°N., 75°E.) in July 1959 was recovered near Lahore (c. 31°30'N., 74°20'E.) in October of the same year (JBNHS 58: 284).



× c. 1/2

Tadorna ferruginia



■ Breeding

▨ Non-breeding

GENERAL HABITS. Less gregarious than most other ducks. Usually seen in pairs and small parties, less commonly in flocks of twenty or more. But occasional enormous congregations have been recorded, e.g. on Chilka lake in Orissa, one such estimated by an experienced duck hunter (L. A. Craven) at 'not less than 15,000' (JBNHS 49: 313). Rather aggressive in disposition, and intolerant of feeding competitors of its own and other species. Its flesh is considered rank and fishy, therefore sportsmen usually leave it alone. Nevertheless it is excessively wary and difficult to approach in its winter quarters, flying off and giving the alarm to other ducks long before they have scented danger. Contrary to this, ridiculously tame and confiding on its breeding-grounds, e.g. in Ladakh and Tibet where conditioned to non-molestation from the Buddhist inhabitants, even settling and waddling about on the flat roofs of Tibetan houses and nesting in lumber rooms (Ludlow, JBNHS 33: 79). Walks well and with ease; grazes on dry river banks and grassy lake margins like geese.

FOOD. Omnivorous; takes grain, tender shoots and tubers, crustaceans, molluscs, aquatic insects, reptiles, etc. Alleged to share carrion with vultures occasionally; this needs confirmation.

VOICE and CALLS. A loud, nasal, clanging *aang-aang* rather like the Greylag's in the distance, uttered on the ground as well as in flight.

BREEDING. Around the high-altitude lakes and swamps above c. 4000 m. in Ladakh, e.g. Pangong, Tsokri, and Tso Moriri. Possibly also in the Khumbu region of Nepal at c. 5000 m. *Season*, chiefly May and June. *Nest*, a thick pad of white down (the duck's own) in a hole or fissure in a cliff, often far from water and maybe several hundred metres above a lake or bog. The ducks flying about the rugged contours or alighting like pigeons on rocky pinnacles high up on a forbidding mountainside present a curiously unrealistic spectacle. *Eggs*, 6 to 10, ivory white, moderately broad ovals, about equal at both ends. Average size of 85 eggs 67.0 × 47.0 mm. (Baker). Incubation mainly by female (?). Incubation period 28–30 days (Delacour). Both parents tend the ducklings, frequently of more than one brood: in one case as many as 34 ducklings accompanying a single pair recorded (Ludlow, *Ibis* 1928: 229). The downy chicks probably shuffle and tumble their way down the rugged slopes to the water. Osmaston suggests their being carried down in the parent's bill. The actual process has not been observed.

For courtship display etc. see Witherby 1939, 3: 228.

MUSEUM DIAGNOSIS. For description of plumage see Baker 1929, loc. cit. Both sexes possess a rudimentary spur on the carpal joint whose significance is not understood.

Chick (in down). *Above*, dark brown marked with white. *Below*, white. Very similar to chick of *T. tadorna* but with lores dark brown as on crown, *contra* white (Ticehurst).

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂♂	365–387	43–48	60–66	142–146 mm.
♀♀	340–355	38–42	55–60	140–142 mm. (Delacour)

Weight ♂ 3 lb. to 4 lb. 4 oz. (c. 1360 to 2140 gm.); ♀ 2 lb. 10 oz. to 3 lb. 5 oz. (c. 940 to 1500 gm.) (Hume).

COLOURS OF BARE PARTS. Iris rich brown. Bill, legs, and feet black.

MISCELLANEOUS. As *Chākwa-chākwi* (its commonest Hindi name for male and female respectively) the Brahminy Duck has won immortality in popular folklore. Legend describes the birds as a pair of lovers torn apart by unkind fate, ceaselessly calling and answering each other in anguished tones.

91. Common Shelduck. *Tadorna tadorna* (Linnaeus)

Anas Tadorna Linnaeus, 1758, Syst. Nat., ed. 10, 1: 122 (Sweden)

Baker, FBI No. 2262, Vol. 6: 414

Plate 8, fig. 4, facing p. 160

LOCAL NAMES. *Shāh chākwa*, *Safēd sūrkhāb*, *Rararia* (Hindi); *Shāh chākā* (Bengal); *Thār jo nirāgi* (Sind).

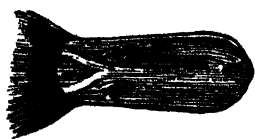
SIZE. Domestic duck \pm ; length c. 61 cm. (24 in.).

FIELD CHARACTERS. A handsome, strikingly coloured duck, chiefly white, black, and chestnut, with a distinctive bright red upturned bill and pink legs.

Male (adult). *Above*, head and neck glistening greenish black. Rest of upperparts white with two broad black bands along either side of upper back (scapulars). Glistening green wing-speculum bordered above by a chestnut patch. *Below*, white. A broad chestnut hoop or girdle around upper breast and shoulders. A broad black band from breast to vent and a conspicuous red knob above base of bill.

Female considerably smaller and duller coloured, with the chestnut breast feathers edged with black vermiculations.

Young (immature). Head and neck dull blackish; interscapulars dark brown; no chestnut breast band but sides sometimes suffused with chestnut.



$\times c. \frac{1}{2}$

STATUS, DISTRIBUTION and HABITAT. Casual and uncommon winter visitor; fairly plentiful in certain years. Recorded in W. Pakistan (Baluchistan, Sind, the former NWF Province), Punjab, Kashmir, Delhi, Uttar Pradesh

(Mainpuri, Banda, Sitapur districts), Bengal (Murshidabad district, Calcutta Salt Lakes), Assam (Brahmaputra river), Manipur (Logtak lake), East Pakistan, Bihar (Monghyr, Darbhanga and Patna districts), Orissa (Chilka lake), Gujarat (Kutch, Saurashtra), Madhya Pradesh (Neemuch), south to the Deccan (Poona). Has occurred regularly in small numbers in recent years in parts of Sind and Punjab (C. D. W. Savage, 1966, *in epist.*). On open lakes and large rivers. Not recorded on sandy and muddy sea coasts and estuaries where chiefly met with in Europe.

Extralimital. 'Breeds on coasts of W. Europe, including the British Isles; locally about the shores of the Mediterranean, Black, and Caspian seas, east on the saline lakes of central Asia to E. Siberia, Mongolia, and

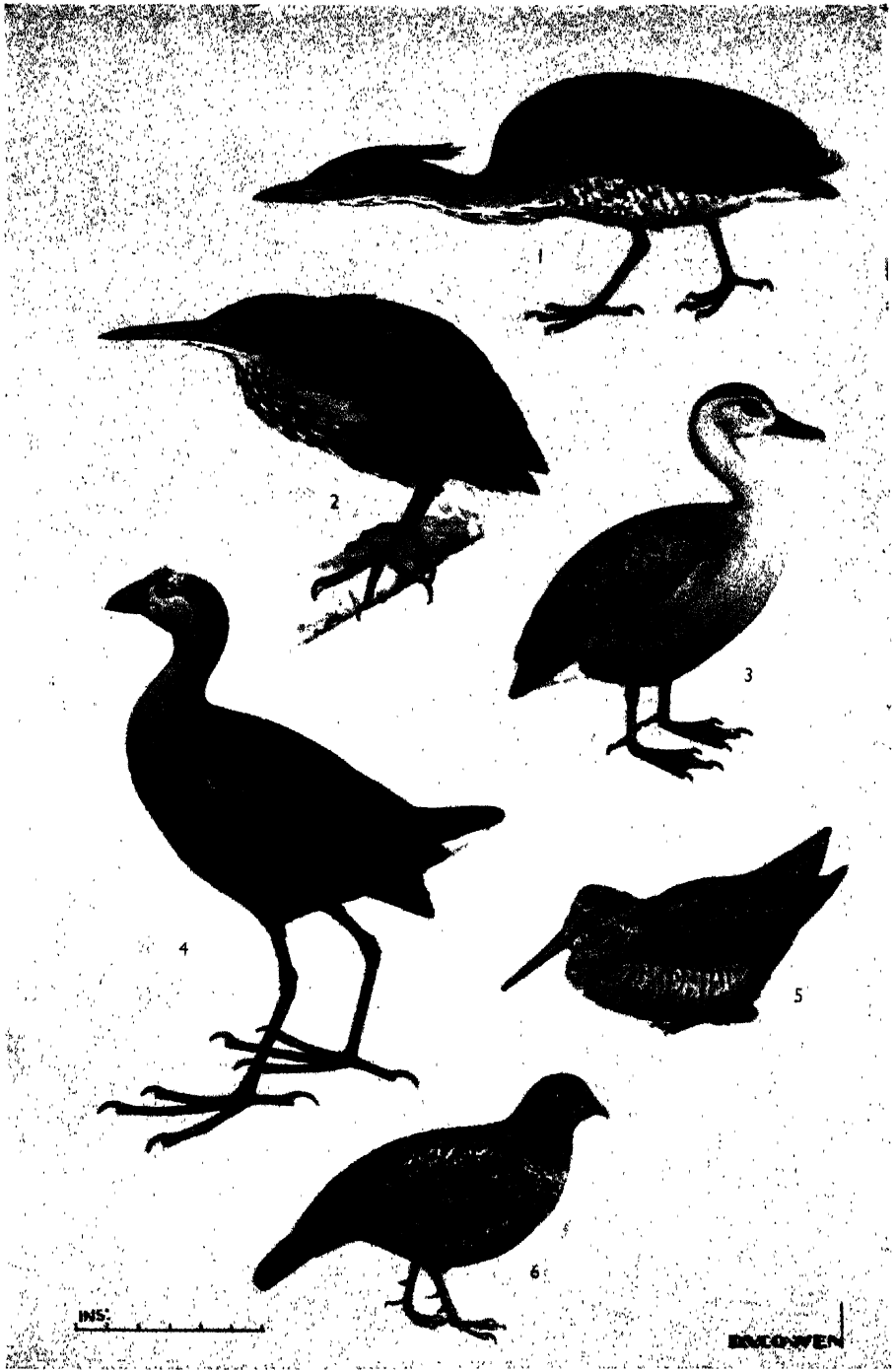


PLATE 7

1 *Gorsachius m. melanolophus*, Malay Bittern (53). 2 *Dupetor f. flavicollis*, Black Bittern (58). 3 *Dendrocygna javanica*, Lesser Whistling Teal (88). 4 *Porphyrio p. poliocephalus*, Purple Moorhen (349). 5 *Scolopax r. rusticola*, Woodcock (411). 6 *Galloperdix s. stewarti*, Red Spurfowl, ♂ (277).

Tibet. Winters from southern part of its breeding range to N. Africa, Arabia, India, south China and Japan' (Peter Scott).

GENERAL HABITS. Normally more gregarious than the Brahminy. In our area occurs sporadically and irregularly in small parties here and there in the northern parts of the subcontinent. Perhaps more regular on the larger open lakes such as the Manchar and Chilka, and on broad rivers, e.g. the Indus and Brahmaputra, with extensive mudspits and shingle banks. 'Hundreds' recorded on the Chilka in December 1937; practically none the following year! Keeps to mudflats more than water, sauntering about with the facility of geese.

FOOD. Molluscs, crustaceans, insects, and worms. Also algae, seeds, leaves and tubers of aquatic plants, etc.

VOICE and CALLS. Apparently not heard in India. Recorded elsewhere as a clear whistle (male) and a harsh short quack (female).

BREEDING. The only record in our area is from W. Pakistan — near Khushdil Khan lake, Quetta dist. (Christison, JBNHS 43: 486). Breeds more commonly in neighbouring Seistan (Persian Baluchistan). *Season*, May-June. *Nest*, a bed of down in a natural crevice or hollow in a cliff or bank. *Eggs*, 8 to 16, pearly white. Average size of 100 eggs 65.7×47.3 mm. (Baker). (For further details see Witherby 1938, 3: 223.)

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂♂	318-350	52-60	50-57	110-130 mm.
♀♀	290-334	44-54	48-52	100-115 mm.
				(Delacour)

Weight ♂ 2 lb. to 2 lb. 14 oz. (c. 910-1300 gm.); ♀ 2 lb. to 2 lb. 2 oz. (c. 910-960 gm.) (Hume & Marshall).

COLOURS OF BARE PARTS. Iris brown. Bill deep fleshy red to coral-red; nail darker and brownish. Legs and feet fleshy pink to fleshy red; claws black.

Genus *ANAS* Linnaeus

Anas Linnaeus, 1758, Syst. Nat., ed. 10, 1: 122. Type, by subsequent designation.

Anas boschas Linnaeus = *Anas platyrhynchos* Linnaeus (Lesson, 1828, Man. d'Orn., 2: 417)

Includes the Dabbling or Surface-feeding ducks characterized by shorter tail and shorter legs than shelducks (*Tadorna*) set farther back in the body, producing a more waddling gait on land. Tarsus with shields in front. Hind-toe (hallux) with a much narrower inner lobe than in Pochards or the so-called Diving ducks. Also characterized by a common behaviour and display pattern.

Genus cosmopolitan. Represented in India by twelve species many of which were formerly assigned to separate genera. Most species sexually dimorphic. For further details see Delacour 1956, 2: 17-22.

Key to the Species

Adult males in breeding plumage

		Page
A	Speculum wanting	<i>A. angustirostris</i> 147
B	Speculum always present	1
1	Bill spatulate	<i>A. clypeata</i> 172

	Page
Bill not spatulate	a
a Outer wing-coverts blue or blue-grey.....	<i>A. querquedula</i> 169
Outer wing-coverts not blue or blue-grey	I
I Central tail-feathers greatly lengthened and pointed, extending from 75 to 100 mm. beyond upper tail-coverts	<i>A. acuta</i> 149
Central tail-feathers moderate in length and not elongated	a ¹
a ¹ Large-sized (length c. 61 cm. = 24 in.); bill broad (23 mm. across at widest point).....	b ¹
Medium-sized (49-56 mm. = 19-22 in.); bill narrow (15-18 mm. across at widest point).....	b ²
Smaller-sized (38-43 cm. = 15-17 in.).....	b ³
b ¹ Speculum purple-blue or green; outer webs of long pointed tertiaries edged with white....	<i>A. poecilorhyncha</i> 157
Speculum purple-blue; no white on edges of tertiaries	<i>A. platyrhynchos</i> 160
b ² Tail-coverts longer than rectrices	<i>A. falcata</i> 165
Tail-coverts shorter than rectrices	c ¹
c ¹ Central tail-feathers extending 30 mm. or more beyond upper tail-coverts.....	<i>A. penelope</i> 167
Central tail-feathers extending less than 30 mm. beyond upper tail-coverts	<i>A. strepera</i> 163
b ³ Speculum : Outermost secondaries black with narrow white tips, those next to them brilliant metallic green and their coverts tipped rufous	<i>A. crecca</i> 151
Speculum : Outermost secondaries black with wide white tips, those next to them bronze-green at base, then black tipped with white and their coverts tipped rufous	<i>A. formosa</i> 154
Speculum : Outer secondaries black, except two or three in the centre which are bronze-green	<i>A. gibberifrons</i> 155
Adult females, and males in eclipse plumage	
A Speculum wanting	<i>A. angustirostris</i> 147
B Speculum always present	1
1 Bill spatulate	<i>A. clypeata</i> 172
Bill not spatulate	a
a Outer wing-coverts blue or blue-grey	<i>A. querquedula</i> 169
Outer wing-coverts not blue or blue-grey	I
I Underparts brown or mottled brown	a ¹
Underparts white or whitish.....	a ²
a ¹ Small nuchal crest.....	<i>A. falcata</i> 165
Nuchal crest absent	b ¹
b ¹ Outer edge of tertiaries white forming conspicuous patch on wing	c ¹
White patch absent	c ²
c ¹ Speculum blue-violet or green	<i>A. poecilorhyncha</i> 157

	Page
c ³ Speculum purple-blue bordered in front and behind with black and white band, the white predominating	<i>A. platyrhynchos</i> 160
Speculum dark dull brown splotched with green or bronzy overtones	<i>A. acuta</i> 149
Outer secondaries black except two or three in the centre which are bronze-green	<i>A. gibberifrons</i> 155
a ² Speculum white	<i>A. strepera</i> 163
Speculum dull blackish, sometimes glossed with green and bordered inwardly by white edges of long pointed tertiaries	<i>A. penelope</i> 167
Speculum: Outermost secondaries black with narrow white tips, those next to them brilliant metallic green sometimes narrowly tipped with black and white, their coverts tipped rufous	<i>A. crecca</i> 151
Speculum: Outermost secondaries black with wide white tips, those next to them bronze-green at base, then black tipped with white and their coverts tipped rufous	<i>A. formosa</i> 154

92. Marbled Teal. *Anas angustirostris* Ménétrières

Anas angustirostris Ménétrières, 1832, Cat. Rais. Obj. Zool. Caucase : 58
(Lenkoran, Transcaspia)

Baker, FBI No. 2277, Vol. 6: 445

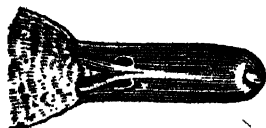
Plate 8, fig. 5, facing p. 160

LOCAL NAME. *Choi* (Sind).

SIZE. Domestic duck —; length c. 48 cm. (19 in.).

FIELD CHARACTERS.

Adult. *Above*, overall greyish brown, spotted or marbled with pale greyish buff and blackish. A large brown patch from eye to nape. A slight nuchal crest. Speculum or wing-mirror inconspicuous, dull pale brown. *Below*, sullied white, more or less barred transversely with brown. Sexes alike; female slightly smaller.



× c. $\frac{1}{2}$

Young (immature). Like adult but markings duller and greyer, the large creamy spots on the

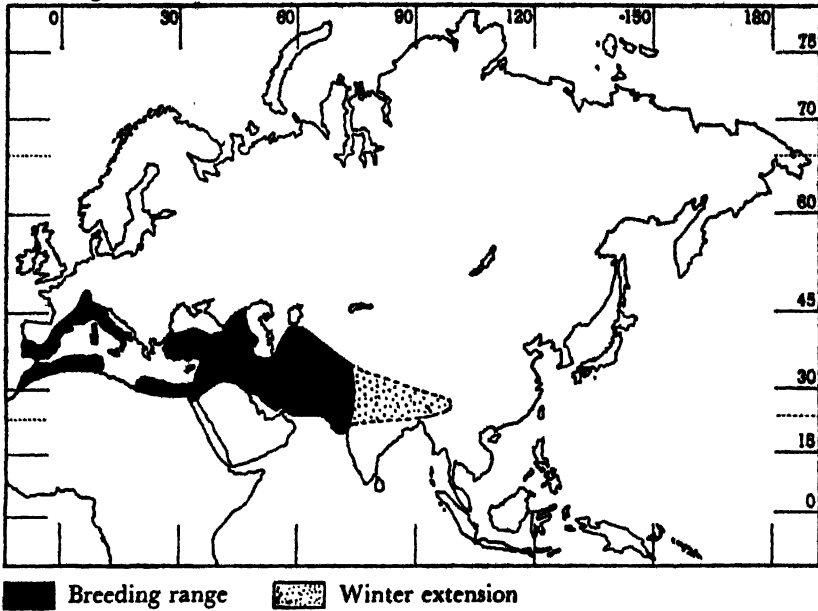
upperparts lacking. Underparts almost uniform.

STATUS, DISTRIBUTION and HABITAT. Peripheral breeding range in W. Pakistan (Baluchistan, and possibly also Sind where not uncommon throughout the year, e.g. on the Manchar, and fairly abundant in winter). Chiefly a rare winter visitor to northern parts of the subcontinent. Has occurred frequently but erratically in the former NWF Province (Nowshera), Punjab (Bahawalpur), and as a straggler in Uttar Pradesh, Madhya Pradesh, Rajasthan (Bikaner, Bharatpur districts), Gujarat (Kutch, Bhavnagar, Ahmedabad, and Baroda districts), Bengal (Calcutta area), Assam (Sibsagar district), Maharashtra (Ahmednagar, Poona). Affects reedy and matted

vegetation-covered jheels, inundated tamarisk forest, etc., normally avoiding open water.

Extralimital. Resident (breeds) in Mediterranean Basin from southern Spain to Near East, Persia, Baluchistan, and NW. India (Peter Scott).

Anas angustirostris



GENERAL HABITS. Normally in pairs or small parties; occasionally larger flocks in winter. Habits rather coot-like; dropping into cover after a short flight rather than flying round and round with other ducks when disturbed by gunfire. Feeds chiefly swimming.

FOOD. Almost entirely vegetarian — shoots, tubers, seeds of aquatic plants. Partly also worms, molluscs, aquatic insects and larvae.

VOICE and CALLS. Silent. Male's calls variously described as a 'weak nasal squeak', 'a whistling croak' and 'a low croaking whistle'. Also a loud and abrupt quack (female?). But apparently insufficiently known and needs accurate recording.

BREEDING. Breeds in West Pakistan (Khushdil Khan lake near Quetta c. 1500 m. altitude; Sonmiani jheel, Las Bela); possibly also on the Manchar in Sind, and in Gujarat as conjectured but not yet substantiated. *Season*, May/June. *Nest*, of rushes and weeds, unlined or sometimes scantily so with down; concealed among weeds and rushes on swampy ground or on an islet in a lake. *Eggs*, 9 to 12, pale creamy, rather long elliptical oval in shape, with a smooth glossy surface. Average size of 122 eggs 46.5×34.2 mm. (Baker). Share of the sexes in incubation not recorded. Incubation period 25 days (Delacour).

MUSEUM DIAGNOSIS. Bill long, narrow, high near base, depressed beyond the nostrils, with very short lamellae. The absence of a metallic speculum is a curious

departure from the normal condition in its close relatives of the genus *Anas*. Previously placed in a separate genus, *Marmarohetta*, considered from structure and habits to bridge *Nettion* with *Anas*, now united (Johnsgaard 1961, Bull. B.O.C., 81: 37-43).

Chick (in down). Like Mallard (q.v.) in pattern, but brownish grey above, pale grey below.

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂ ♂	205-215	43-45	36-38	85-105 mm.
♀ ♀	198-205	—	—	—

(Delacour)

Weight ♂ 1 lb. 3 oz. to 1 lb. 5 oz. (c. 535-592 gm.); ♀ 1 lb. to 1 lb. 3 oz. (c. 450-535 gm.) (Hume & Marshall).

COLOURS OF BARE PARTS. Iris brown. Bill blackish with a dull grey-green triangle at the base (more pronounced in ♀) and a whitish subterminal line in ♂. Legs and feet olive-brown, the webs blackish.

93. Pintail. *Anas acuta* Linnaeus

Anas acuta Linnaeus, 1758, Syst. Nat., ed. 10, 1: 126 (Sweden)

Baker, FBI No. 2274, vol. 6: 437

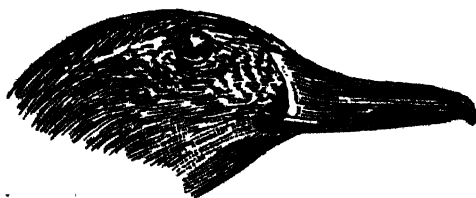
Plate 1, fig. 4, facing p. 16

LOCAL NAMES. Sand, Seenkh pār (Hindi); Kokārālī, Drigōsh (Sind); Dhrūgūchho (Kutch); Dig hāns, Badā digar, Sholoncho (Bengal); Dighōnch (Mirshikars, Bihar); Digunch (Nepal); Nanda, Nanja (Orissa); Nejl hāns, Dighal negi (Assam); Daophlantu loubi (Cachar); Meitunga (Manipur).

SIZE. Domestic duck —; length ♂ c. 56-74 cm. (22-29 in.).

FIELD CHARACTERS.

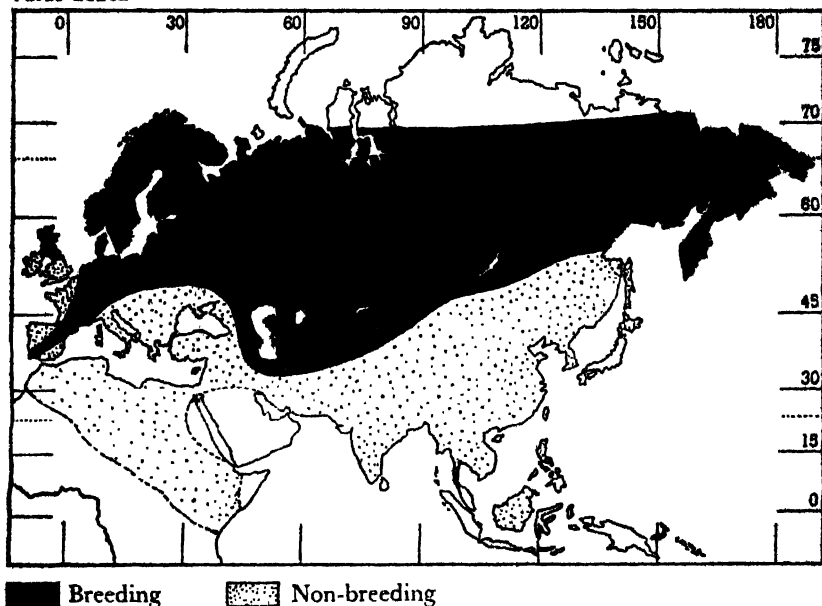
Male (breeding). Elongated body, slender neck, and long pointed pin-like central tail-feathers diagnostic. Black under tail-coverts with a broad buff patch in front, additional pointers. Head, face, and throat chocolate; hindneck black. A white band running down either side of neck, broadening into white of breast and belly. Upper plumage and flanks largely grey, finely vermiculated with black. Conspicuous silver-grey edges to long black pinnate scapulars and upper tail-coverts. Speculum metallic bronze-green.



× c. ½

Male (in eclipse). More or less like female, sometimes with the mantle dark ashy- or blackish grey coarsely vermiculated with greyish white.

Female (adult). Mottled brown and buff with pointed but pinless tail. Rather like slender female Gadwall but lacking its characteristic white wing-patch and orange bill. Absence of prominent speculum distinguishes her from female Mallard. In overhead flight the peculiar trident-like ending — the two feet with pointed tail projecting between — identifies it.

Anas acuta

Young (immature) male has wing coloration of adult male, but with faint light edges to wing-coverts. Rest like female.

STATUS, DISTRIBUTION and HABITAT. Winter visitor. Common, widespread, and locally abundant: all-India, both Pakistans, Nepal, Ceylon; probably also Andaman and Nicobar islands whence not yet reported. Affects reedy and vegetation-covered jheels, brackish lagoons, and estuaries.

Extralimital. 'Breeds in the northern parts of Europe, Asia, and N. America, including British Isles. Winters south to N. Africa, the Nile Valley, Ethiopia, the Persian Gulf, India, Ceylon, Burma, Siam, S. China . . .' (Peter Scott).

MIGRATION. Arrives in W. Pakistan and NW. India in September and October; normally well spread out east and south by middle of November. Mostly gone by end March. Recoveries of Russian-ringed birds in India and vice versa suggest that our migrants originate chiefly from the Caspian region and Siberia, lying between *c.* 45° and 65°N. lat. and *c.* 48° and 100°E. long. — at single straight-line distances on the map of up to about 5000 km.

GENERAL HABITS. One of our commonest migratory ducks. Keeps in flocks of 15 or 20 to several hundred strong. Early in the season parties often composed entirely of drakes. Usually wild and wary, swift on the wing, and invariably seeming in tearing haste. The peculiar hissing or swishing sound produced by the rapid wing-beats of a flock overhead is

audible from considerable heights. One of the species most sought after by duck hunters both for its sporting qualities and its excellence as a table bird. Seems uncannily aware of this human predilection and is always amongst the first to zoom out of gunshot range when shooting has commenced on a jheel, or to clear right away to other waters while the less prized species are still milling around and paying the toll. Largely a crepuscular and nocturnal feeder, flock after flock fighting at sundown from the daytime retreat on some weedy jheel to forage in favourite marshes or squelchy paddyfields, and back again before dawn. This morning and evening 'fighting' provides exhilarating sport for duck hunters. Where hunting pressure is not heavy, may continue to feed till the sun is well up, or even during the day, walking about freely and grubbing on marshy tank edges or in wet paddy stubbles. In shallow water the food is procured by the characteristic tipping up or up-ending of the non-diving or surface-feeding ducks. A flock engaged in this way, with merely the tail ends projecting above the surface here and there, presents a singularly comical sight.

FOOD. Chiefly vegetable matter — grass, corms, shoots, and seeds of aquatic plants, and wild and cultivated rice. To a lesser extent also molluscs, worms, water insects and larvae.

VOICE. Very silent. No calls recorded in India.

BREEDING. Entirely extralimital. For particulars of courtship display, nesting, etc. see Witherby 1939, 3: 271-2.

MUSEUM DIAGNOSIS. For description of plumages, moults, etc. *ibid.*: 273-5.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	254-287	48-59	39-44	172-209 mm
♀♀	242-266	45-50	38-42	—

Weight ♂ 1 lb. 10 oz. to 2 lb. 12 oz. (c. 730-1250 gm.); ♀ 1 lb. 2 oz. to 1 lb. 14 oz. (c. 500-850 gm.) (Hume & Marshall).

COLOURS OF BARE PARTS. Iris dark brown, often tinged with red. Bill light to dark plumbeous, the culmen, lower mandible, and base, darker. Legs and feet dark plumbeous-grey or blackish; webs, claws, and joints blacker.

MISCELLANEOUS. Flight speed, chased c. 104 km./h (Sprunt & Zim).

94. Common Teal. *Anas crecca crecca* Linnaeus

Anas Crecca Linnaeus, 1758, Syst. Nat., ed. 10, 1: 126 (Sweden)

Baker, FBI No. 2271, Vol. 6: 431

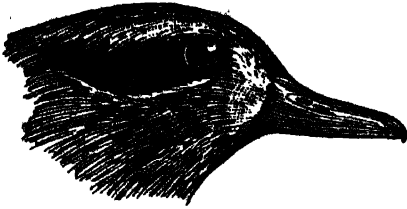
Plate 1, fig. 3, facing p. 16

LOCAL NAMES. *Chhōti mūrghābi*, *Kerra*, *Lohiya kerra*, *Chowtee*, *Patāri*, *Souchuruka* (Hindi); *Naroib*, *Patāri hāns*, *Tālsibigri* (Bengal); *Baijla* (Mirshikars, Bihar); *Baijila gairi* (Nepal); *Kardo* (Sind); *Kildāwōdi* (Tamil); *Yeranda* (Malayalam); *Solari hākki* (Kannada); *Kalimari*, *Chila hāns*, *Patāri hāns* (Assam); *Daophlantu kashiba* (Cachari); *Sērūwā* (Sinhala); *Serit* (Manipur).

SIZE. Half-grown domestic duck ±; length c. 38 cm. (15 in.).

FIELD CHARACTERS.

Male (breeding). Pencilled greyish, with chestnut head and a broad metallic green band running backward from in front of eye to nape, narrowly bordered above and below with whitish. A tricoloured wing bar (speculum) — black, metallic green, buff — particularly conspicuous in flight.



x c. 1

Male (in eclipse). Head as in female, but crown and nape blackish brown, the feathers narrowly edged with buffish cinnamon. Mantle and scapulars edged and marked with rufous-buff.

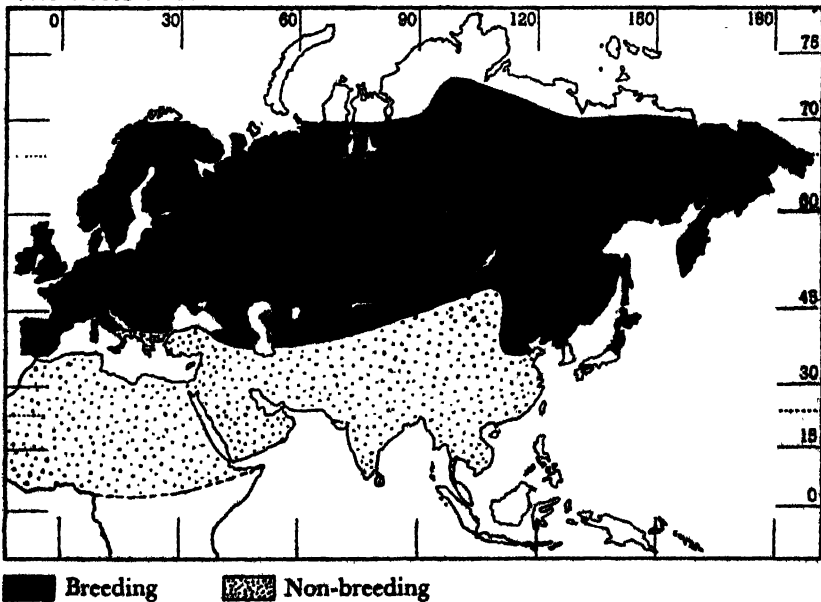
Female (adult). Mottled dark and light brown, with black and green wing speculum, and pale underparts. May be confused with female Garganey (q.v.), but the prominent speculum is distinctive. At rest, and at close range, speckled brown throat (v. unmarked whitish) is also a pointer.

Young (immature). Belly spotted; secondaries shorter.

STATUS, DISTRIBUTION AND HABITAT. Winter visitor. Common, widespread and locally abundant: all India, both Pakistans, Nepal, Ceylon, Andaman, Nicobar, and Maldivé islands. Affects tanks, jheels, and marshes, chiefly freshwater.

Extralimital. 'Breeds in Europe and Asia from Iceland to China, Manchuria and Kurile Islands, and Japan. Winters as far south as N. Africa, Nile Valley, Somaliland, Persia, India, to southern China and the Philippines' (Peter Scott).

Anas crecca crecca



MIGRATION. Together with the Garganey, one of the earliest ducks to arrive in autumn, numbers being already in in W. Pakistan and NW. India by middle or end August, the influx continuing till November, by which time the birds are widely spread out. Many birds moult the remiges after reaching their winter quarters in India, becoming flightless for a time. Mostly gone again by end March; some staying on as late as May. Observed on northward passage in Ladakh, at over 3000 m. altitude in April (Meinertzhagen). Recoveries to date of Russian-ringed Teal in W. Pakistan and India, and Indian rings in the USSR, indicate that our winter visitors are derived from the Caspian region east to Kirghiz SSR (between c. 50° and 90°E.), and north in Siberia to c. 68°N.

GENERAL HABITS. One of our commonest and most abundant ducks, widely scattered in the plains country on every sort of marsh and inland water, large or small, provided it is shallow, has a muddy bottom, and a plentiful supply of aquatic vegetation. Judged by the qualities that most appeal to the sportsman — abundance, swiftness and versatility on the wing, and palatability — one of our gamiest species. Keeps in small parties and large flocks of up to 200 or more, congregating at times in swarms (together chiefly with the Garganey) that literally blacken acres of marshland and sky, e.g. in the Little Rann of Kutch, before emigration.

On migration, or when commuting to and from distant nocturnal feeding-grounds, the birds fly in a succession of wide Vs or wavy convex lines with a broad front; when disturbed by gunfire on a jheel, usually in close-knit packs which turn and twist in unison with the speed and agility of the smaller waders. They have an uncanny ability to jink in mid-air — braking to a sudden momentary halt in full flight, changing course and rocketing vertically into the sky upon discovering the gunner's ambush or to avoid his forwardly directed shots. Feeding is done by up-ending in shallow water as well as by grazing and grubbing on marshy land.

FOOD. Almost entirely vegetarian: shoots, tubers, and seeds of aquatic plants, and grains of wild and cultivated rice.

VOICE and CALLS. A low musical far-sounding *krit, krit* by the male; a short sharp quack by the female, usually uttered when suddenly alarmed.

BREEDING. Entirely extralimital. For particulars of courtship display, nesting, etc. see Witherby 1939, 3: 246.

MOULT. Some individuals — presumably our earliest arrivals — leave their breeding grounds even before the post-nuptial (autumn) moult, contrary to the norm in migratory ducks. They shed their wing quills simultaneously after reaching their winter quarters, becoming completely flightless for a time.

MUSEUM DIAGNOSIS. For description of plumages, moults, etc. see Witherby 1939, 3: 248–50.

Chick (in down). Very similar to Mallard (q.v.), blackish brown and yellow, with two dark lines on face.

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂♂	175–192	34–38	27–30	62–72 mm.
♀♀	170–180	31–36	—	—
				(Delacour)

Weight ♂ ♀ 7·7 oz. to 12 oz. (c. 225–340 gm.)—Hume & Marshall.

COLOURS OF BARE PARTS. Iris brown. Bill black, paler and browner under lower mandible; in female more yellow-brown, sometimes tinged with green. Legs and feet light bluish or olive-grey to deep slaty blue or dark olive-plumbeous.

95. **Baikal, Clucking or 'Formosa' Teal.** *Anas formosa* Georgi

Anas formosa Georgi, 1775, Bernerk. Reise Russ. Reich, 1: 168 (Lake Baikal, Siberia)

Baker, FBI No. 2272, Vol. 6: 433

Plate 8, fig. 6, facing p. 160

LOCAL NAMES. Unrecorded.

SIZE. Common Teal +; length c. 40 cm. (15½ in.).

FIELD CHARACTERS. A remarkably beautiful teal.

Male (breeding). With a distinctive gaudily patterned head. Crown, nape, hindneck, and throat black. Face, sides of upper foreneck, and below the throat buff, narrowly margined with white. A narrow crescentic vertical black band from eye down across the face to the black throat. Crown from in front of and above eye bordered on each side by a narrow white band looping forward down the sides of the black nape into the buff lower throat. A broad crescentic metallic green band from behind eye down sides of head bounded behind by the white loop and in front by the buff facial patch. Mantle slaty grey, pencilled with brown and black. Inner scapulars and tertiaries very long and lanceolate as in the Garganey, velvety black, white and cinnamon. Speculum black and bronze-green, edged with black and white. *Below*, breast vinaceous, spotted with black. Sides slaty. Rest of underparts largely white.

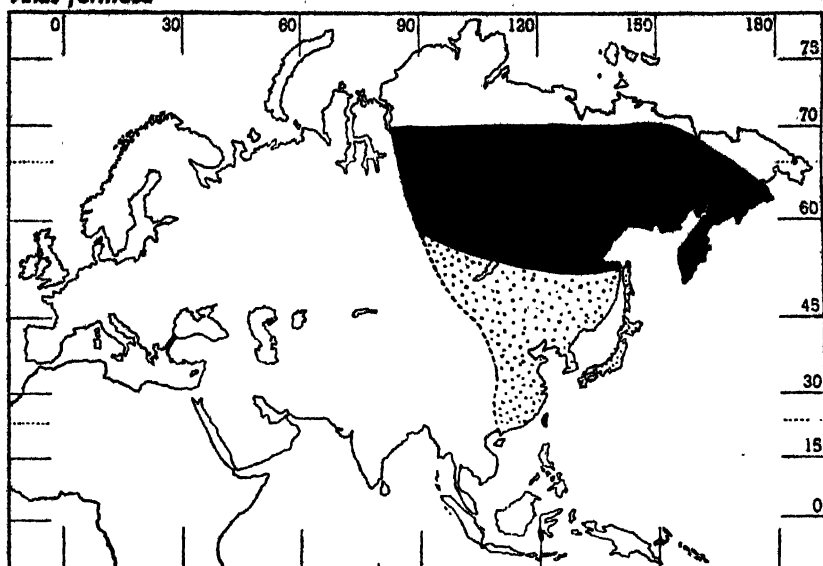
Female (adult). Overall brown, similar to female Common Teal but for somewhat larger size and the distinctive head pattern—crown dark; face light speckled brown with dark lines above the eyes from eye to nape. A round white patch at base of bill (below the brown lores).

Young (immature). 'Like female but plainer, with no white patch near bill' (Delacour).

STATUS, DISTRIBUTION and HABITAT. Very rare and sporadic winter visitor. Has been recorded at long intervals about a score of times in the last 70 years or so, in Sind, Punjab, Rajasthan, Gujarat, Uttar Pradesh, Bihar, Bengal, Assam, Manipur, the most recent being a sight record on the Jumna near Delhi, 12 May [*sic*] 1947 (R. S. Symons). Owing to similarity of female with female Teal, possibly some examples go undifferentiated, in spite of larger size.

Extralimital. 'Breeds in Siberia east from the Yenisey river to the Kolyma delta and Anadyr, south to Lake Baikal, northern Sakhalin and northern Kamchatka. Winters in China and Japan.¹ Recorded from Formosa but derives its name not from that island but from the fact that "formosa" is the Latin for "beautiful"' (Peter Scott).

¹ Very abundant winter visitor in southwestern Japan particularly in certain years, flocks numbering 10,000 having been observed. The highest single day's catch of three men operating six throw-nets on a pond was 10,000 Baikal Teal! (Austin & Kuroda 1953).

Anas formosa

■ Breeding ■ Non-breeding

GENERAL HABITS. Nothing recorded in India except that in one instance in Manipur the birds were in a party of 8 to 10.

VOICE and CALLS. Described of captive birds as exactly like the loud clucking of a hen.

BREEDING. Extralimital.

MUSEUM DIAGNOSIS. Apart from larger size, female differs from female *crecca* by an appreciably broader bill (150+ mm. v. 140— mm. at widest point near tip). Lower back and rump nearly uniform grey-brown, a little darker on the shafts, v. very dark brown, each feather conspicuously margined greyish or buffish in *crecca*. Wing speculum in both very similar but tippings of greater secondary coverts narrower and rufous-buff throughout v. broader and white, only tinged with buff posteriorly in *crecca*. For details of plumage see Baker, loc. cit.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	203-219	33-38	c. 31-35	86-95 mm.

COLOURS OF BARE PARTS. Iris brown, red-brown, or chestnut-brown. Bill dark bluish to slaty black or black. Legs and feet pale plumbeous or slaty blue (Baker).

96. Grey, Andaman or Oceanic Teal. *Anas gibberifrons albogularis* (Hume)

Mareca albogularis Hume, 1873, Stray Feathers, 1: 303 (Andamans)

Baker, FBI No. 2273, Vol. 6: 435

Plate 8, fig. 7, facing p. 160

LOCAL NAMES. Unrecorded.

SIZE. Half grown domestic duck \pm ; Common Teal $+$. Length c. 43 cm. (17 in.).

FIELD CHARACTERS.

Male (breeding). *Above*, dark (almost chocolate) brown, the feathers edged greyish producing a scaly or scalloped effect. Throat, foreneck, and a varying area encircling eye white, this colour sometimes extending to entire face. Wings brown with a green and black speculum bordered in front and behind by whitish bands, the former broad and conspicuous. *Below*, buffy grey spotted with dark brown.

Female differs only in being slightly duller coloured with less distinct centres to the feathers. The green of the speculum more coppery. 'The broad white wing-bar is most conspicuous in flight' (Butler, JBNHS 11: 333).

Young (immature). Like female but dusky markings on lower plumage less distinct, and white eye-ring narrower and more fulvous.

STATUS, DISTRIBUTION and HABITAT. Endemic in the Andaman group of islands (Landfall, Coco, Great Coco, and others). Nomadic, and on many islands apparently only a winter visitor. Affects outlying freshwater jheels and swamps; also tidal creeks and salt water.

GENERAL HABITS. Less common than the two Whistling Teals. Keeps in flocks of twenty or thirty, feeding chiefly at night by walking about and grubbing in wet paddyfields like Common Teal. Spends much of the day roosting perched up amongst the mangrove trees or on rocks exposed at low tide. The flocks break up into small parties and pairs as the breeding season approaches.

FOOD. Chiefly vegetarian — tender shoots of crops, grain, etc. Probably also insects, worms, crustaceans, etc.

VOICE. A soft whistle. Also described as having a low quacking call-note.

BREEDING. *Season*, the only dependable record (Osmaston, JBNHS 17: 491) is of a nest containing ten nearly fresh eggs on August 4. *Nest*, in a natural hollow high up in lofty dead tree-trunks, usually inaccessible. *Eggs*, normal clutch? Long, elliptical, cream-coloured ovals. Average size of 10 eggs 49.0×36.3 mm. (Baker). Incubation period, share of the sexes in the domestic chores, etc. not recorded.

MUSEUM DIAGNOSIS. The northern Andamans population was hitherto designated as a separate race — *A. g. leucopareus* Fleming — on account of larger extent of white on face and neck. This is now shown to be a case of partial albinism probably caused by too much inbreeding, and the race is currently considered untenable.

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂♂	199-205	34-36	35-37	79-81 mm.
♀♀	197-205	34-35	—	—
				(Delacour)

Weight c. 425 gm.

COLOURS OF BARE PARTS. Iris reddish brown or red. Bill greenish blue, plumbeous-blue, or plumbeous with the nail black; in some examples lower mandible variously tinged with pink. Legs and feet dark greenish or plumbeous; claws black.

ANAS POECILORHYNCHA J. R. Forster

Key to the Subspecies

		Page
A	No white band posterior to the speculum..... <i>A. p. zonorhyncha</i>	159
B	A broad white band posterior to the speculum.....1	
1	A red spot on each side of base of bill..... <i>A. p. poecilorhyncha</i>	157
	No red spots on bill..... <i>A. p. haringtoni</i>	159

97. **Spotbill Duck.** *Anas poecilorhyncha poecilorhyncha* J. R. Forster*Anas poecilorhyncha* J. R. Forster, 1781, Indian Zool. : 23, pl. 13, f. 1 (Ceylon)

Baker, FBI No. 2265, Vol. 6: 421

LOCAL NAMES. *Gärm pāi*, *Gugral* (Hindi); *Hänjār* (Sind); *Läddim* (Mirshikars, Bihar); *Näddum* (Nepal terai); *Kara* (Manipur); *Bōr māghi hāns* (Assam).

SIZE. Domestic duck; length *c.* 61 cm. (24 in.).

FIELD CHARACTERS. A large duck of scaly-patterned buffy grey and dark brown plumage. Narrowly black-and-white margined metallic green wing speculum, bordered above (posteriorly) by a broad pure white bar particularly conspicuous in flight. Bright coral-red legs, yellow-tipped dark bill, and two swollen orange-red spots at its base on either side of forehead, are further diagnostic clues.

× *c.* ½

Female slightly smaller and duller than male; but conclusive sex differentiation possible only on voice (q.v.).

Young (immature). Like adult but paler, less spotted below, and with no red spots at base of bill.

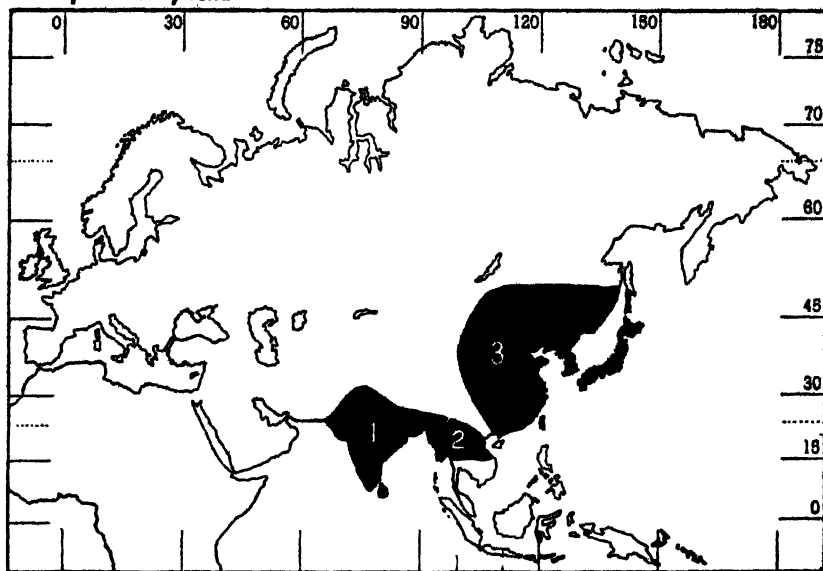
STATUS, DISTRIBUTION and HABITAT. Resident, nomadic, and locally migratory. Common and widely though capriciously distributed, and nowhere really abundant. Throughout the Indian subcontinent, locally up to *c.* 1200 m. elevation, east of the lower Indus river (occasionally Baluchistan), and Kashmir (to *c.* 1800 m.) to western Assam. South to Mysore, and occasionally Ceylon. Frequents reedy and vegetation-covered jheels, shallow irrigation tanks, etc. Rarely also on rivers.

A flock of over 200 (subspecies?) reported on Neill Island, Andamans Group (E. G. Silas, *in epist.*, March 1960), but its occurrence there needs confirmation.

GENERAL HABITS. Very similar to the Mallard, usually seen in pairs, family parties, or moderate sized flocks. A strong flier but less quick in take-off than the Mallard, rising less abruptly and vertically. Prized by sportsmen as much for its sporting qualities as for excellence as a table bird. A non-diving duck, obtaining most of its food by walking about and grubbing on marshland or in wet paddyfields, or by up-ending in shallow water to reach the bottom mud, tail sticking above the surface and legs kicking to maintain the vertical stance. But it can dive very effectively to evade capture when wounded or moulting wing, surfacing only momentarily in a flash, or with just the bill showing. Often it holds on thus to partially submerged vegetation and remains completely hidden from view.

FOOD. Chiefly vegetarian — shoots, corms, etc. of aquatic plants, seeds of sedges, grain of wild and cultivated rice, etc. The birds occasionally do considerable damage to rice crops by trampling down a great deal more than they eat. Sometimes also water insects, and their larvae, worms, and molluscs. Among the animal items specifically identified in stomach contents is the water-snail *Vivipara (bengalensis ?)*.

Anas poecilorhyncha



Residential range 1 *A. p. poecilorhyncha*; 2 *A. p. haringtoni*; 3 *A. p. zonorhyncha*

VOICE. Almost indistinguishable from the Mallard's — a hoarse wheezy note by the drake, and a loud quack by the duck particularly when suddenly startled. As a rule very silent.

BREEDING. *Season*, not strictly defined. Depending largely on water conditions, but chiefly July to September/October in north and peninsular India; November/December in the south. Possibly two broods a year. Not Ceylon. *Nest*, a pad of grass and weeds concealed in herbage on the margins of a tank or swamp; sometimes lined with a small quantity of feathers and down. *Eggs*, 6 to 12, normally 7 to 9, greyish buff or greenish white, rather broad ovals, smooth and fine textured; very similar to those of the Mallard. Average size of 100 eggs 56.0×42.3 mm. (Baker). Incubation, believed to commence with last egg, takes about 24 days. The drake's share in this is unknown, but he assists the duck in guarding and leading the ducklings.

MUSEUM DIAGNOSIS. No eclipse plumage in male. Both sexes undergo a post-nuptial moult when all the wing quills are cast simultaneously, the female sometimes possibly incubating in this condition (Sálim Ali, JBNHS 44: 219).

Chick (in down). Like Mallard, blackish above with yellow back and wing markings and underparts, but the black line through eyes a little broader and blacker (Delacour).

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂ ♂	260-280	60-65	46-48	120-140 mm.
♀ ♀	250-268	50-55	—	—

(Delacour)

Weight ♂ 2 lb. 4 oz. to 3 lb. 5 oz. (♂. 1230-1500 gm.) — Hume; ♀ 1 lb. 12 oz. — 3 lb. (♂. 790-1360 gm.) — Baker.

COLOURS OF BARE PARTS. Iris light to dark brown. Bill black, the terminal third or less yellow to orange-yellow or orange, tipped black. A spot at base of bill on each side of forehead orange-red to coral-red. Legs and feet deep coral-red; claws black.

98. **Burmese Spotbill Duck.** *Anas poecilorhyncha haringtoni* (Oates)

Polionetta haringtoni Oates, 1907, Jour. Bomb. nat. Hist. Soc., 17: 558

(Shan States)

Baker FBI No. 2267, Vol. 6: 423

Plate 4, fig. 10, facing p. 64

LOCAL NAME. *Bôr mûghi hâns* (Assamese).

SIZE. Same as 97 ±.

FIELD CHARACTERS. 'Similar to the Indian Spotbill, but a little smaller, the underparts more uniform, less spotty; very small or no red dots on the base of the bill' (Delacour). Also with conspicuously white-bordered green speculum.

Young (immature) and Chick (in down) as in the Indian race.

STATUS, DISTRIBUTION AND HABITAT. Resident. Extreme eastern Assam (N. Lakhimpur, Dibrugarh).

Extralimital. Burma, Shan States, Yunnan.

GENERAL HABITS, FOOD, VOICE, etc. Similar to those of the Indian subspecies.

BREEDING. Two nests, similar to those of the Indian race, recorded from Lakhimpur by Baker on 6 February and 13 April respectively. In the Shan States nests have been taken in February, April, June, July, and November. Eggs, 6 and 14, more or less incubated, have been found in nests, but normal clutch-size uncertain. Average size of 27 eggs 52.7 × 39.6 mm. (Baker).

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill
♂ ♂	245-268	50-57 mm.
♀ ♀	237-255	— mm. (Delacour)

COLOURS OF BARE PARTS. As in the Indian race.

An intermediate example between this and *zonorhyncha* has been recorded from eastern Assam (1937, JBNHS 39: 638).

99. **Eastern Grey Duck.** *Anas poecilorhyncha zonorhyncha* Swinhoe

Anas zonorhyncha Swinhoe, 1866, Ibis: 394 (Ningpo, China)

Baker, FBI No. 2266, Vol. 6: 422

SIZE. As No. 97 ±.

FIELD CHARACTERS. Differs from the Indian Spotbill by duller, less conspicuously marked plumage with darker practically unspotted underparts, and absence of the two red spots at base of culmen. A broad line, heavily speckled with black, from base of bill to ear-coverts. Supercilium, chin, cheeks, and throat more contrastingly whitish. Speculum *blue* (instead of green) and only narrowly bordered with white. White on secondaries restricted and much less conspicuous. Nail of bill *yellow* (v. black in *A. p. poecilorhyncha*). Sexes alike; female slightly smaller.

Young (immature) duller than adult.

STATUS, DISTRIBUTION and HABITAT. Migratory. A frequent straggler in winter to eastern Assam (Sibsagar dist.) and Manipur. Once also procured in Bihar (Darbhanga dist., C. M. Inglis).

Extralimital. Breeds in eastern Siberia, Manchuria, Mongolia, N. China, Korea, S. Sakhalin, the Kurile Is., and Japan. Winters south to S. China and Formosa (Peter Scott).

GENERAL HABITS, FOOD, VOICE, etc. Nothing specifically recorded in India. Elsewhere said to haunt sea coasts as well as inland waters.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)
♂ ♂	254-276	56-63 mm.
♀ ♀	243-260	—
		(Baker, Delacour)

For a male and female from Chinwangtao, E. China, La Touche (1931-34) gives Wing ♂ 282, ♀ 265 mm.

COLOURS OF BARE PARTS. As in the Indian (nominate) race, but nail of bill yellow and red spots at base lacking.

100. **Mallard.** *Anas platyrhynchos* Linnaeus

Anas platyrhynchos Linnaeus, 1758, Syst. Nat., ed. 10, 1: 125 (Sweden)

Baker, FBI No. 2264, Vol. 6: 419

Plate 4, fig. 9, facing p. 64

LOCAL NAMES. *Nilsir*, *Nir rugi* (Hindi); *Nilsir* (Bengal); *Lilgeh* (Mirshikars, Bihar); *Lilg* ♂, *Lilgahi* ♀ (Nepal); *Amrolia hāns*, *Bonaria pāti hāns* (Assam); *Nirāgi*, *Hirāgi* ♂, *Nirāgiāni* ♀ (Sind); *But*, *Rāje* (Kutch).

SIZE. Domestic duck; length c. 61 cm. (24 in.).

FIELD CHARACTERS.

Male (breeding). Largely grey above and below, finely pencilled and vermiculated with black. Glistening metallic dark green head and neck separated from chestnut breast by narrow white collar. Rump, tail-coverts, and two upcurled central tail-feathers black. Speculum metallic purplish blue bordered in front and behind by narrow black and white bands, conspicuous in flight. Yellowish green bill; orange legs.

Female (and male in eclipse plumage). Brown and buff, streaked and spotted with black. Chin, throat and foreneck plain buff; an irregular dark line through the eye. Orange legs. Distinguished from the very

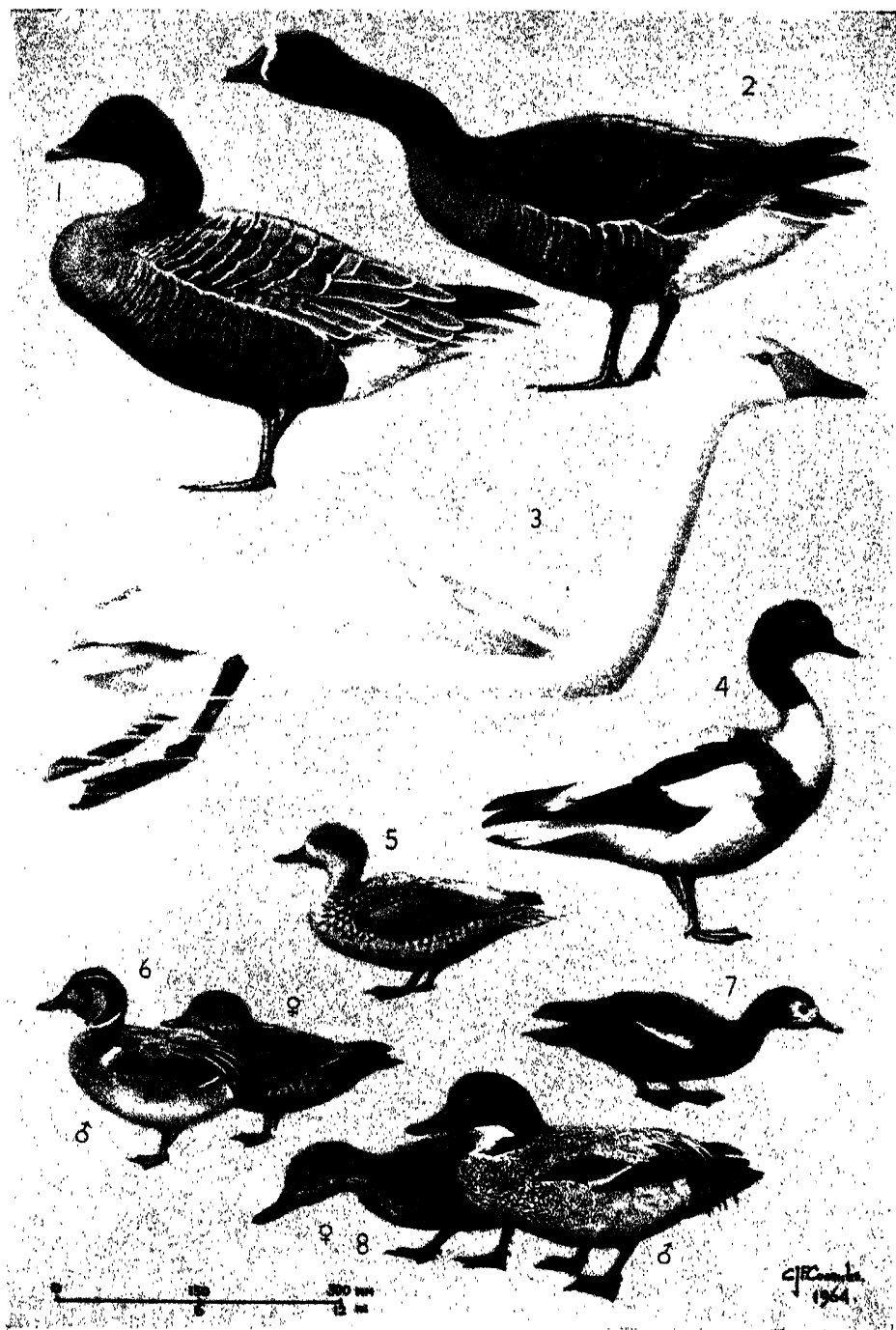
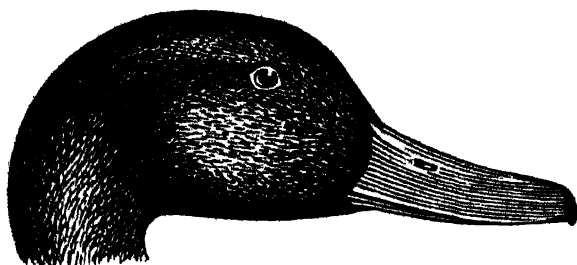


PLATE 8

1 *Anser f. brachyrhynchus*, Pinkfooted Goose (SE). 2 *Anser a. albifrons*, Whitefronted Goose (79). 3 *Cygnus c. jankowskii*, Whistling Swan (85). 4 *Tadorna tadorna*, Common Shelduck (91). 5 *Anas angustirostris*, Marbled Teal (92). 6 *Anas formosa*, Baikal Teal (95). 7 *Anas g. albogularis*, Grey Teal (96). 8 *Anas falcata*, Falcated Teal (102).

similar ♀ Shoveller, also orange-legged, by bill shape and purple-blue speculum (v. green).



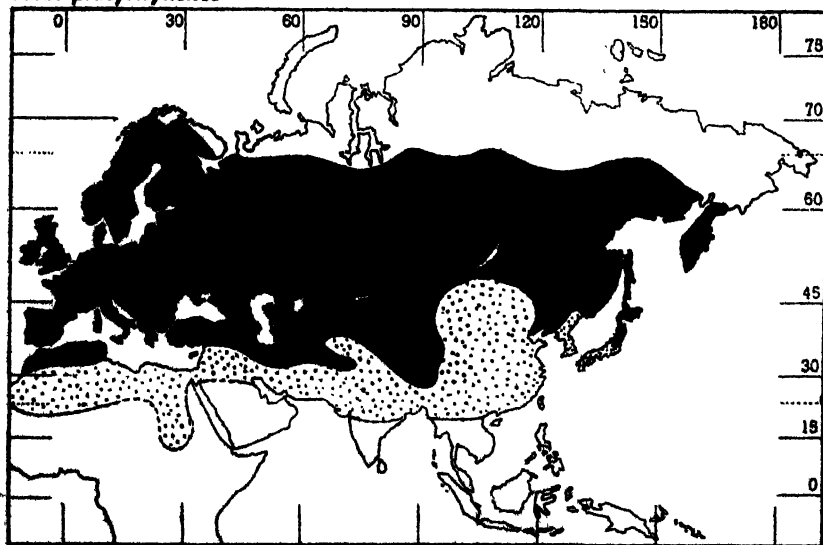
× c. 1/2

Young (immature). Like female, but duller and less well marked.

STATUS, DISTRIBUTION and HABITAT. Breeds in small numbers in Kashmir. Mainly winter visitor. Apparently no longer so common in northern W. Pakistan (Bahawalpur) where until c. 1940 at least it often formed 70 to 80 per cent of sportsmen's seasonal bags of duck. Common in lower Sind, decreasingly so eastward through U.P., Nepal, Bihar, Bengal, E. Pakistan to Assam; southward sparingly to rare to about 19°N. in Orissa, Madhya Pradesh, Gujarat and northern Maharashtra. Exceptional if further south; no record. Frequents shallow reedy jheels (or dhands) and marshes; rarely also rivers and ponds.

Extralimital. Throughout the Holarctic Region. In Europe and Asia breeds from the Arctic Circle south to the Mediterranean and roughly

Anas platyrhynchos



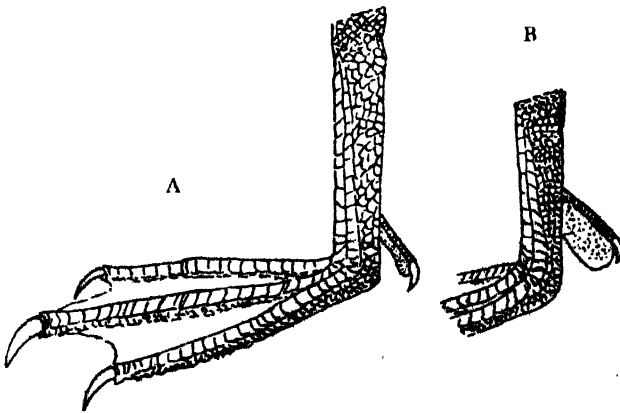
■ Breeding

▨ Non-breeding

to latitude 30°N. Winters from southern half of breeding range to N. Africa, Nile Valley, India, Burma, S. China and Japan. Several small endemic populations have been described, e.g. from Mexican highlands (*diazi*), Greenland (*conboschas*), Hawaii Is. (*wywilliana*), Laysan I. (*laysanensis*), but the species is evidently monotypic.

MIGRATION. Mallards ringed in W. Pakistan (Manchar lake, Sind; Jhajja, Bahawalpur) between c. 27° & 30°N. and 68° & 72°E. have been recovered in the Novosibirsk region of USSR, between c. 52° & 56°N. and 67° & 79°E., indicating that a large proportion of our winter visitors are derived from Siberia. The speed of migratory flight has elsewhere been estimated as c. 80 km. per hour.

GENERAL HABITS. A typical surface-feeding or dabbling duck, the ancestor of all our domestic breeds. Gregarious. Keeps in parties and small flocks of seldom more than a dozen or so; sometimes up to 40 or 50. Where persecuted does most of its feeding during the night, flying at dusk to outlying inundated paddyfields and marshes, and returning to the daytime refuge at dawn. Walks with ease dabbling for food on squelchy ground, or up-ending to rake the bottom mud as it swims in shallow water. The projecting tail is directed backwards to attain the vertical stance, assisted by a constant kicking of the legs. It is a swift and powerful flier, capable of rising almost vertically off the water or land when alarmed. Usually wary and difficult to circumvent, and excellent for the table; therefore combining all the requisites of a coveted sporting bird, and eagerly sought by duck hunters. Though not an underwater feeder, can dive quite effectively to evade capture when wounded.



Foot of Mallard (A) and Common Pochard (B) to show difference in hind toe of surface-feeding and diving ducks

FOOD. Chiefly vegetarian: corms, seeds and shoots of Gramineae and other aquatic plants, wild and cultivated rice, etc. To a lesser extent also molluscs, tadpoles, fish spawn, worms, etc.

VOICE and CALLS. Of drake a wheezy 'scraping'; of duck a loud rather explosive *quack* when suddenly alarmed and flying off. Also a loud *quack-quack-quack-quack-quack*, the first quack very loud, the others decreasingly

so but quicker repeated. This is uttered as a call-note and can be effectively imitated by hunters to decoy the birds. The female (?) also gives a series of rapid *tuckata-tuckata-tuckata* notes signifying satisfaction on discovering food.

BREEDING. Bates & Lowther (1952), have shown that Major Cock's account in Hume & Oates (1889-90) of 'boatloads' of Mallard eggs from the Kashmir lakes being brought to Srinagar market for sale was a palpable exaggeration. At the present time only very small numbers breed on Hokarsar, Anchar, and other lakes in the Kashmir Valley. *Season*, late April, May and June. *Nest*, a bed of dry grass, rush leaves, and a quantity of the bird's own (blackish) down; sometimes bulky and rimmed with a thick well-felted layer of down, at others without any. Placed on the ground in thick cover of sedges, grass, and bushes on the edge of a lake or some distance from water. *Eggs*, 6 to 10, long ovals, more or less equal at both ends. Normally greenish grey, sometimes pale dull yellowish stone or pale buff; close-textured, smooth-surfaced, with a slight gloss. Average size of 100 Indian eggs 56.6×40.3 mm. (Baker). Only the female incubates. Incubation period 26 days (Witherby, q.v. also for courtship display and other details of breeding biology).

MUSEUM DIAGNOSIS. For details of plumages, etc. see Witherby 1939, 3: 236-9.

Chick (in down). 'Blackish brown above, with yellow face, underparts, and spots on the back and wings; a dark line through the eyes and shorter ones or spots on the ears; sometimes a small dark streak at the base of the bill' [Delacour 1956, 2: 42; 70 (plate)].

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♂	266-292	50-57	c. 40-45	80-97 mm. (Baker)
♀ ♀	232-276	44-55		

Weight ♂ 2 lb. 8 oz. to 4 lb. (c. 1135-1800 gm.); ♀ 1 lb. 10 oz. to 2 lb. 10 oz. (c. 735-1195 gm.) -- Hume & Marshall.

COLOURS OF BARE PARTS. Iris brown. Bill dull olive-yellow, or dingy green, the base and gape yellower or orange; nail black. Legs and feet orange-yellow to coral-red; claws black.

MISCELLANEOUS. Flight speeds: cruising 48; chased 64-80 km.p.h. (Sprunt & Zim).

101. Gadwall. *Anas strepera strepera* Linnaeus

Anas strepera Linnaeus, 1758, Syst. Nat., ed. 10, 1: 125 (Sweden)

Baker, FBI No. 2269, Vol. 6: 426

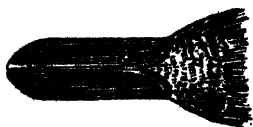
Plate 1, fig. 2, facing p. 16

LOCAL NAMES. *Mylā*, *Bhuār*, *Beykhur* (Hindi); *Peeing hāns* (Bengal); *Myle* (Mirshikars of Bihar; Nepal); *Burd*, *Buār*, *Buhār* (Sind); *Saru mūgi hāns* (Assam); *Thoidingnam* (= 'sesamum-flavoured', Manipur).

SIZE. Domestic Duck—; length c. 51 cm. (20 in.).

FIELD CHARACTERS.

Male (breeding). General effect dark brown and grey, with whitish belly and very black tail end (black upper and under tail-coverts). Dark and light crescentic markings on breast almost forming a pectoral band. A glistening white patch (secondaries) on trailing edge of wing broadly bordered anteriorly with black (middle secondaries), and a chestnut patch (lesser wing-coverts) very conspicuous in flight. At rest the chestnut patch with the black-and-white speculum is a



× c. ½

diagnostic pointer.

Male in eclipse. Like female, but greyer and less heavily marked above.

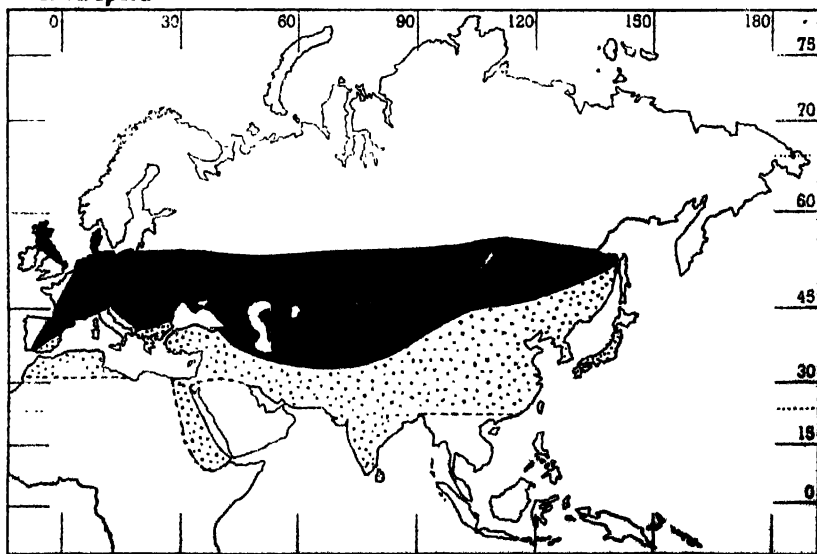
Female (adult). A duller and smaller edition of female Mallard, dark brown mottled with buff, with the chestnut on wing obsolete. Also with orange-yellow legs. Diagnosed in flight by white wing-mirror as in drake; at rest, when this often concealed, by smaller size, slighter build, and absence of Mallard's metallic speculum.

Young (immature). Male similar to drake in eclipse. Female like adult duck but with wings less bright coloured.

STATUS, DISTRIBUTION and HABITAT. One of our commonest wintering ducks. Both Pakistans, Nepal, all India, lessening progressively southward. Rare in S. India; only a single record in Ceylon. Affects reedy marshes and jheels, large and small, with plenty of cover; open water-spread of dammed reservoirs only occasionally as daytime refuges.

Extralimital. Europe, Asia, and western North America. In Eurasia breeding from Iceland to Kamchatka, south to England, Holland, Germany, central Russia, Caspian, Seistan, Transbaikalia. Wintering south to northern Africa, Ethiopia, S. China.

Anas strepera



■ Breeding ■ Non-breeding

MIGRATION. Gadwall ringed in W. Pakistan, on the Manchar lake, c. 26°N., 68°E., have been recovered in USSR chiefly between 50° and 60°N. lat. and 60° and 80°E. long. in the Omsk region of Novosibirsk, therefore almost due N., at straight-line distances of over 3000 km.

GENERAL HABITS. Very similar to Mallard, and typical of the surface-feeding or dabbling ducks. Gregarious and predominantly vegetarian. Usually keeps in small flocks of 10 to 30 birds or so. Feeds by walking about and dabbling on marshland or in squelchy paddyfields, or by up-ending in shallow water to rake the bottom mud. Sometimes also dives for food, and can do so very effectively when wounded and evading capture. Flight swift, with rapid strokes of the pointed wings producing a low whistling sound. A highly prized sporting bird, ranking with mallard and pintail amongst the finest for the table. Also one of our most abundant migratory ducks, usually well represented in duck hunters' bags in northern India.

FOOD. Chiefly seeds, shoots, and tubers of marsh plants and aquatic weeds, and grains of wild and cultivated rice. Occasionally insects, worms, molluscs, etc.

VOICE. In both sexes very mallard-like. The quack of the duck is somewhat less loud. 'The male has a soft, breathy call and a raucous, croaking note "oe" often repeated, and followed by a sharp whistle, used in display' (Delacour).

BREEDING. Extralimital. Nest like Mallard's, on ground, near water. Eggs, '7 to 15, usually 8-12, creamy buff like those of the Wigeons, 54 × 36 mm.; incubation 25-26 days' (Delacour).

MUSEUM DIAGNOSIS. For detailed description of plumages see Witherby 1939, 3: 242-4.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	270-285	c. 48-54	c. 36-40	c. 82-98 mm.
♀♀	220-256			

Weight ♂ 1 lb. 8 oz. to 2 lb. 4 oz. (c. 575-1025 gm.); ♀ 1 lb. to 1 lb. 12 oz. (c. 450-800 gm.).

(Baker)

COLOURS OF BARE PARTS. Iris dark brown. Upper mandible dark slaty brown; lower mandible paler and yellowish or reddish underneath. Legs and feet yellow, brownish yellow to dull orange; claws black.

MISCELLANEOUS. Flight speed: cruising 29 m. (c. 47 km.) p.h. (Sprunt & Zim).

102. **Falcated or Bronzecapped Teal.** *Anas falcata* Georgi

Anas falcata Georgi, 1775, Bemerk. Reise Russ. Reich, 1: 167 (Asiatic Russia)

Baker, FBI No. 2268, Vol. 6: 424

Plate 8, fig. 8, facing p. 160

LOCAL NAME. *Kālā sinkhur* (?) (Uttar Pradesh).

SIZE. Domestic duck —; Gadwall ±; length c. 51 cm. (20 in.).

FIELD CHARACTERS.

Male (breeding) strikingly peculiar and beautiful. Head metallic bronzy green and chestnut-purplish, with a bushy mane-like nuchal crest falling over hindneck, resting on back and giving the impression of a thick neck. Throat and foreneck white with a narrow green collar near base. General aspect of body plumage grey, wavily pencilled with black and resembling Gadwall's, the markings bolder and more crescentic on breast. Speculum glossy black and green, bordered in front by a grey band (wing-coverts). Inner secondaries very long, sickle-shaped (falcated) — velvety black, white, and grey — covering hind part of body and tail. Upper tail-coverts black, overtopping tail.

Female (adult). Very like female Gadwall, but wing mostly grey with black-and-green (*v.* white) speculum, a short nuchal crest, and *grey* (not yellow) legs.



× c. $\frac{1}{2}$

Young (immature). Like the female; males more finely vermiculated.

STATUS, DISTRIBUTION and HABITAT. Rare but not infrequent winter straggler to Assam (Lakhimpur, Sibsagar, Nowgong, Kamrup, Sylhet districts; Surma Valley), and Manipur. Vagrants recorded in Bihar (Tirhut, Patna, Darbhanga districts), Uttar Pradesh (Lucknow, Roorkee districts), Delhi, Punjab (Jhelum, Karnal districts), West Pakistan (Sind, Bahawalpur), Gujarat (Kutch dist.). Females in hunters' bags sometimes possibly misidentified as Gadwall.

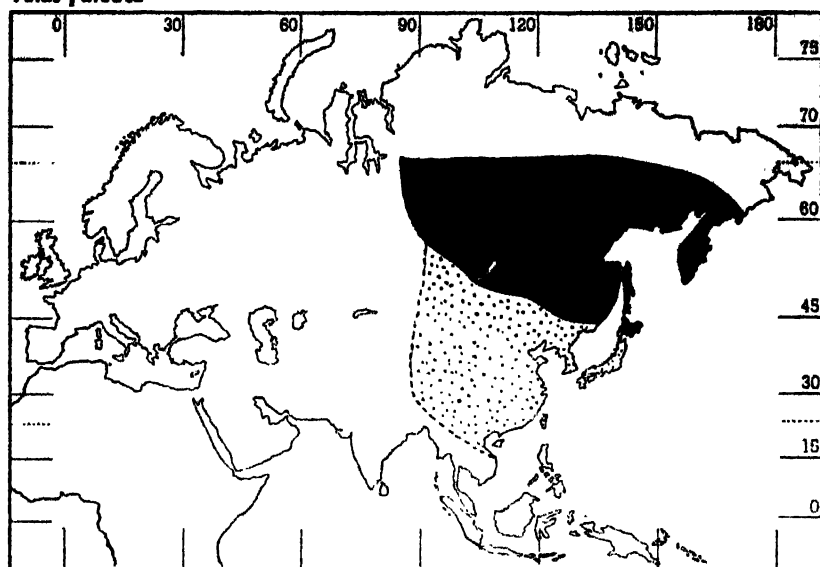
Extralimital. Breeds in N. Asia, south of the Arctic Circle from the upper Yenisey to Kamchatka, south to Lake Baikal, N. Mongolia, the Amur and Ussuriland. Winters in Japan, Korea, E. and S. China to Upper Burma (Peter Scott).

GENERAL HABITS. Nothing specifically recorded in India except that it occurs singly or in pairs on jheels in Assam usually in company with Gadwall (M. J. S. Mackenzie). Once shot from a party of 15 (? mixed species). In flight said to resemble Common Teal with the same swishing sound of wings.

FOOD. Mainly vegetarian.

VOICE. Unrecorded in India. The male's described elsewhere as a loud piercing whistle; also a low chuckling as of Mallard drake when swimming about. The female's as a quack like Gadwall duck's.

BREEDING. Extralimital. *Nest.* Compactly built of reeds and rushes thickly lined with down. *Eggs.* 'Six to ten, 56×40 mm., creamy white; incubation 24-25 days' (Delacour).

Anas falcata

■ Breeding ▨ Non-breeding

MUSEUM DIAGNOSIS. Upper and lower tail-coverts in both sexes very long, extending beyond the tips of the rectrices. Female confusingly like female Gadwall except for colour of legs, and chiefly the different wing speculum.

In female Gadwall entire visible portions of inner secondaries pure white, terminal portions of their larger coverts black; in female *falcata* visible portions of all inner secondaries black (with a metallic green reflection) narrowly tipped with white, and terminal portions of their greater coverts white.

For detailed description of plumage see Baker, loc. cit.

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂ ♂	230-242	40-42	37-40	82-85 mm.
♀ ♀	225-235	38-40	—	—

(Delacour)

COLOURS OF BARE PARTS. Iris dark brown. Bill black. Legs and feet drab, olive-grey, or olive-brown; webs and toes black.

103. Wigeon. *Anas penelope* Linnaeus

Anas penelope Linnaeus, 1758, Syst. Nat., ed. 10, 1: 126 (Sweden)

Baker FBI No. 2270, Vol. 6: 429

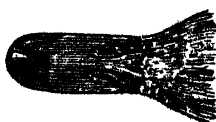
Plate 1, fig. 1, facing p. 16

LOCAL NAMES. *Peasan*, *Patari*, *Pharia*, *Chhōta lālsīr* (Hindi); *Chhōta lālsīr* (Bengal); *Āroon* (Mirshikars, Bihar); *Cheyun* (Nepal); *Pharao* (Sind; Gujarat, Nal Sarovar); *Khaltriya kunda* (Assam); *Thānggongmāl* (= 'like the Brahminy', referring to the drake's ruddy head, Manipur).

SIZE. Domestic duck —; Gadwall —; length c. 49 cm. (19 in.).

FIELD CHARACTERS.

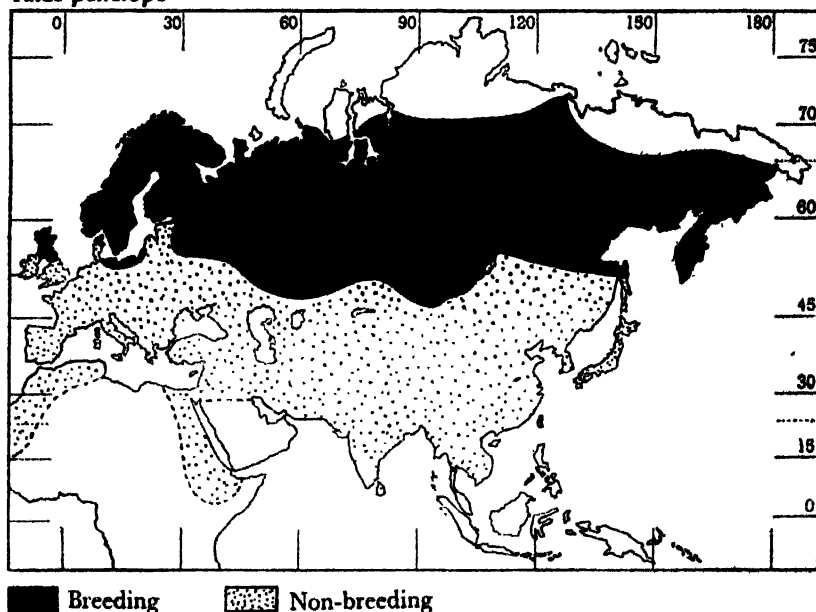
Male (breeding). General aspect pencilled grey. Head and neck chestnut or bright rusty red with a distinctive cream coloured patch on forecrown. Vinous breast, black tail-coverts, a large horizontal white bar on closed wing (coverts), finely black-bordered metallic green speculum, and small narrow blue-grey bill are further diagnostic clues. In flight the broad white shoulder patch near leading edge of wing (coverts), and the buff 'bald' forecrown are conspicuous pointers.



× 6. 1

Male (in eclipse). *Above*, reddish brown, marked and vermiculated with black; *below*, chiefly white.

Female (adult). Similar to male in eclipse 'but much duller, less reddish brown, the dark vermiculations less coarse, the lesser wing-coverts grey. There are two colour phases, one redder the other greyer' (Delacour).

Anas penelope

Differentiated from rather similar female Gadwall by more rufous plumage and metallic green speculum *v.* contrasty white and black.

STATUS, DISTRIBUTION and HABITAT. Winter visitor. Common in Sind and northern India, where locally very abundant. Less common in peninsular and eastern India generally, but in some years very numerous in W. Bengal, E. Pakistan, Assam, and Manipur, and usually so on Chilka lake (Orissa). Sparse and irregular in Ceylon. Observed in Nepal Valley and central Nepal in winter, and on the high altitude lakes (c. 5030 to 5330 m.) in eastern Nepal in May and June presumably on northward passage. Frequents shallow reedy jheels and marshes. Small flocks occasionally also on salt-water creeks and mangrove swamps, e.g. on the Sind coast.

Extralimal. 'Europe and Asia, breeding in temperate regions north to the Arctic Circle and beyond, from Iceland and Scotland to Kamchatka. Winters in Britain and south to the Nile Valley. Abyssinia, India, S. China and Japan' (Peter Scott).

MIGRATION. Wigeon ringed during winter in Sind (Manchar lake, *c.* 26°N., 68°E.) and in central India (Dhar, *c.* 23°N., 76°E.) have been recovered in summer in Siberia between *c.* 55° & 58°N. and 66° & 85°E. One of these was a female accompanied by ducklings, and another a male in post-nuptial moult and flightless, indicating that they were on their breeding grounds and thus disclosing the provenance of possibly the majority of our winter migrants.

GENERAL HABITS. Gregarious; sometimes in very large flocks. Like other non-diving ducks feeds by walking about and grazing or grubbing on grassy edges of jheels and in squelchy paddyfields, or by up-ending in shallow water. Swift on the wing, but perhaps less so than Teal, rising abruptly off the water on alarm and quickly climbing well out of gunshot. Flies in compact flocks or irregular lines with a distinctive rustling sound. Provides good sport to the duck hunter and is excellent for the table. Dives effectively to evade capture when only winged.

FOOD. Chiefly vegetarian: corns, seeds, and shoots of marsh and aquatic plants, and wild and cultivated rice. Also water insects and their larvae, molluscs, etc.

VOICE AND CALLS. Of male a distinctive musical piping whistle *whew-oo*, uttered both on the wing and from the ground or water. Of female a short quack, also described as a 'purring growl'.

BREEDING. Extralimal. *Nest*, of matted grass, reeds, etc. with a thick bed of down for the eggs, hidden in undergrowth usually close to water. *Eggs*. '7 to 12, buffy cream, 54 × 35 mm. on an average; incubation 24 to 25 days' (Delacour).

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	254-273	<i>c.</i> 31-35	<i>c.</i> 35-40	<i>c.</i> 95-110 mm. (Baker)
♀♀	233-256			

Weight ♂ 1 lb. 5 oz. to 1 lb. 10 oz. (*c.* 590-735 gm.); ♀ 1 lb. 3 oz. to 1 lb. 10 oz. (*c.* 535-735 gm.).

COLOURS OF BARE PARTS. Iris brown or red-brown. Bill grey-blue, livid blue, or slate-blue; tip black. Legs plumbeous tinged with grey or green; joints and webs darker; claws blackish.

104. Garganey or Bluewinged Teal. *Anas querquedula* Linnaeus

Anas querquedula Linnaeus, 1758, Syst. Nat., ed. 10, 1: 126 (Sweden)

Baker, FBI No. 2275, Vol. 6: 439

Plate 1, fig. 5, facing p. 16

LOCAL NAMES. *Chāita*, *Khira*, *Patari* (Hindi); *Ghang roib*, *Giria hāns* (Bengal); *Ghila hāns* (Assam); *Chārho*, *Kardo*, *Kāraro* (Sind); *Kārdio* (Gujarat, Nal Sarovar); *Gendu* (Orissa — most duck); *Surit angouba* (= 'white teal', Manipur).

SIZE. Domestic duck —; length *c.* 41 cm. (16 in.).

FIELD CHARACTERS.

Male (breeding). *Above*, head and neck pinky brown streaked with white, and with conspicuous broad white eyebrows. Upperparts blackish brown, scalloped paler. Scapulars long, lanceolate, glossy black, with a broad white median stripe. Wing shoulders (coverts) bluish grey. Speculum green, between two white bands. *Below*, breast light brown, speckled with black. Rest of underparts white, finely waved on sides and spotted near vent (tail-coverts) with black.



$\times c. \frac{1}{2}$

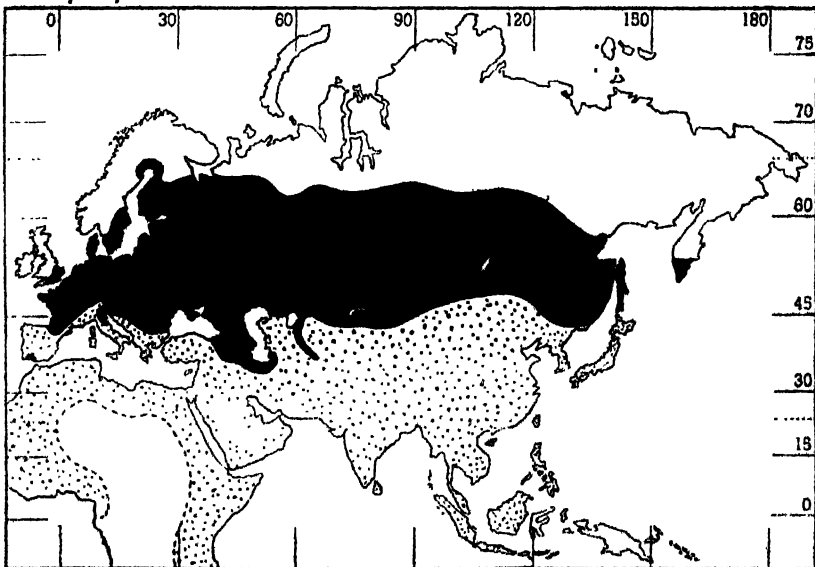
Male (in eclipse). Like female, but with fully coloured ♂ wing.

Young male (immature). Like female but darker, with browner underparts, and better defined speculum.

Female (adult). *Above*, head brown with conspicuous whitish eyebrows, white throat, and a distinct dark line from bill through eye to nape. Rest of upperparts dark brown, scalloped paler. Wing shoulders (coverts) greyish brown. Speculum as in male but rather obscure and the green more olive. *Below*, upper breast and near vent brownish with darker spots; rest of underparts white. May be confused with female Common Teal (*q.v.*), but speculum green and white *v.* tricoloured black, green and buff, and throat unmarked whitish *v.* brown-speckled, are diagnostic pointers.

STATUS, DISTRIBUTION and HABITAT. One of our commonest and most widespread migratory ducks. Perhaps the earliest to arrive in its winter quarters, and certainly one of the last to leave, small parties occasionally being seen till well into May. All India, both Pakistans, Nepal, Ceylon.

Anas querquedula



| Breeding

▨ Non-breeding

Frequents every type of water large and small — jheels, marshes, village tanks, coastal backwaters and lagoons (e.g. in Kerala), the last chiefly as daytime refuges from which to forage in outlying paddyfields during the night.

MIGRATION. Meinertzhagen came across a party of Garganeys on migration at Khardong in Ladakh (4100 m.) as early as 30 July, showing that autumn passage of duck may take place across very high parts of the Himalayas. It is rarely witnessed in daytime unless the birds are forced to the ground by heavy clouds as on this occasion. In NW. India autumn passage is usually in evidence in August, and fair numbers of birds are already in by mid-September, e.g. in Rajasthan (Keoladeo Ghana, Bharatpur). Recoveries of ringed Garganeys in India and the USSR indicate that our visitors are derived from a very extensive northern area, between latitudes 51° & 60°N. and longitudes 30° & 82°E. The most spectacular records so far are of a Bharatpur bird recovered in the Kiev region of the USSR (at 51°19'N., 30°14'E.) and of one ringed in the Leningrad area (60°30'N., 32°50'E.) shot in Maharashtra (Sangli dist., c. 17°N., 75°E.). The straight-line distances on the map between the points of ringing and recovery are c. 5000 and c. 6500 km. respectively, the actual air distance of course being considerably greater.

GENERAL HABITS. Gregarious; non-diving, though like most surface-feeders can dive very effectively to evade capture when wounded. Feeds by walking about and grubbing in marshland and swampy paddyfields, or by up-ending in shallow water. Largely a nocturnal feeder where persecuted, as this and other duck species invariably are. Enormous mixed congregations of tens of thousands of duck and teal collect in certain daytime refuges in winter, e.g. on the Vembanad backwaters in Kerala, and just before northward emigration in March, e.g. on the extensive marsh at the mouth of the Banas river in the Little Rann of Kutch. Garganeys predominate among these. Flight very swift, with less turning and twisting than the Common Teal, in close-packed flocks. Overhead the wings produce a characteristic swishing hiss by which experienced sportsmen can identify the species even in the dark.

FOOD. Mainly vegetarian; seeds and tender shoots of marsh plants, grasses and sedges, and grains of wild and cultivated rice. Also some animal matter: water insects, larvae, worms, molluscs, etc. Shells of *Planorbis* sp. and *Melania tuberculata* have been identified among stomach contents in India.

VOICE. Usually very silent. Hume mentions a loud strident quack apparently common to both sexes; seldom uttered. A harsh grating *kr-r-r* by male in breeding season; also heard just before emigration, likened to a stick rapidly drawn across wooden palings.

BREEDING. Extralimital. *Nest*, a depression in the ground in wet meadows or grassland, lined with fine grasses and the bird's own down. Well concealed. *Eggs*, 7 to 16, usually 8 to 12, creamy buff with a distinct gloss. Average size of 108 eggs 45.5 × 32.8 mm. (Baker). Incubation 21–23 days (Delacour).

MUSEUM DIAGNOSIS. For detailed description of plumages see Witherby 1939, 3: 258–60.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	187-198	35-40	26-30	62-70 mm.
♀♀	175-194	34-39	—	—
				(Baker)

Weight. ♂ 10 oz. to 1 lb. (c. 283-453 gm.) commonly c. 13 oz. (c. 370 gm.); ♀ 9 to 14.75 oz. (c. 255-425 gm.) commonly c. 12 oz. (c. 340 gm.) — Hume & Marshall.

COLOURS OF BARE PARTS. Both sexes: Iris dark brown. Bill brownish black; nail quite black; margins of commissure and gape paler, often reddish. Legs and feet dark grey.

105. **Shoveller.** *Anas clypeata* Linnaeus

Anas clypeata Linnaeus, 1758, Syst. Nat., ed. 10, 1: 124 (Sweden)

Baker, FBI No. 2276, Vol. 6: 442

Plate 1, fig. 6, facing p. 16

LOCAL NAMES. *Tidāri*, *Punāna*, *Tokārūwāla*, *Ghirah* (Hindi); *Panta mukhi*, *Khunte hāns* (Bengal); *Sānkhār* (Mirshikars, Bihar); *Dho baha*, *Sānkhār* ♂, *Khikeria sānkhār* ♀ (Nepal); *Alipāt*, *Gaino*, *Langho* (Sind); *Gaino* (Gujarat, Nal Sarovar); *Phatphajē* (Kutch); *Khantiya hāns*, *Nak dungara* (Assam); *Sēruwā* (Sinhala); *Thārā* (Tamil); *Khārā* (Manipur).

SIZE. Domestic duck —; length c. 51 cm. (20 in.).

FIELD CHARACTERS. Both sexes readily diagnosed by broad, shovel-shaped bill and orange legs.

Male (breeding). Head and neck glossy metallic green (as in Mallard). Pale blue patch on wing-shoulder (coverts) and a white bar between it and metallic green speculum, particularly conspicuous in flight. Breast white; rest of underparts reddish chestnut except two large white patches on posterior flanks.

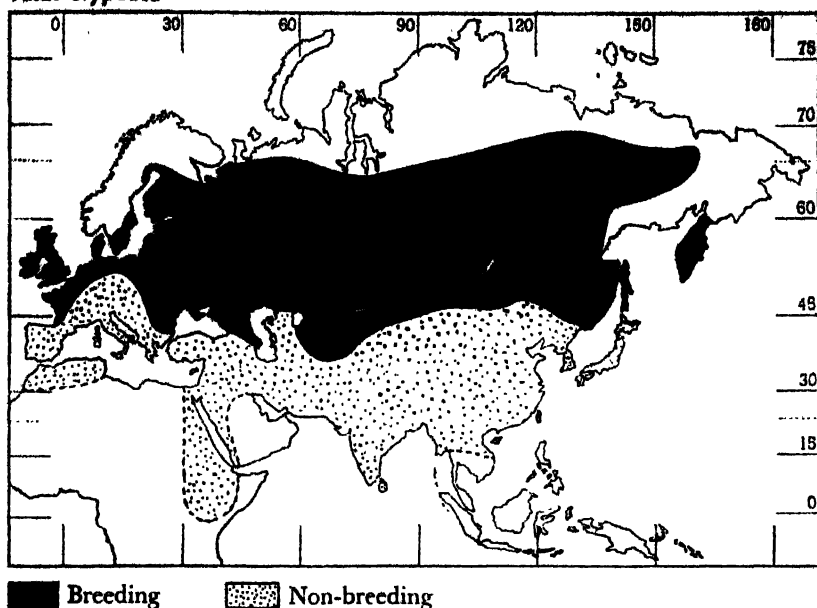
Male (in eclipse). Like female but somewhat darker, and largely retaining bright coloured wing of breeding male.

Female (adult). Mottled dark brown and buff, with greyish-blue shoulder patch, faint green speculum bordered above and below with white, and bright orange bill (at base).

Young (immature). Like adult female but with unbarred mantle and narrowly streaked underparts.

STATUS, DISTRIBUTION and HABITAT. Common winter visitor, arriving fairly late (c. October), and also amongst the last to leave (in N. India small numbers present in May and even till mid-June). All India, both Pakistans, and Ceylon. Occurs also in Nepal Valley in winter, but more common on passage in October/November. Affects all types of inland waters: jheels, irrigation reservoirs, flooded ditches, constantly used village tanks, and sometimes rivers.

Extralimital. Breeds in Europe (commonly in Britain), Asia, and N. America, not north of the Arctic Circle nor in E. Canada. Winters as far south as E. Africa, Persian Gulf, Ceylon, Burma, S. China, Japan, Hawaii, Lower California, Mexico, Honduras, Florida (Peter Scott).

Anas clypeata

MIGRATION. A Shoveller ringed in Sind (Manchar lake c. 27°N., 68°E.) was recovered in the Barabinsk district of Siberia, c. 55°N., 76°E., while one ringed in the Kazakh SSR at c. 50°30'N., 69°35'E. was shot near Delhi c. 29°N., 77°E. These recoveries provide a positive clue to the general northerly area whence our winter visitors are derived. Some individuals moult all remiges simultaneously after reaching their winter quarters in India, becoming completely flightless for a time.

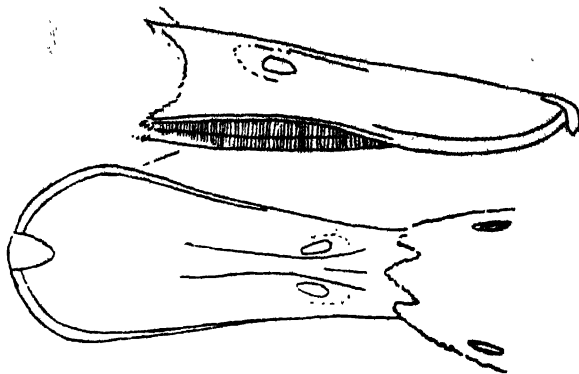
GENERAL HABITS. Usually keeps in small parties in association with Common and Garganey teals. When feeding, swims slowly with neck and broad shovel-bill stretched stiffly in front. The lower mandible is fully immersed furrowing the water while the partially exposed upper skims flat along the surface. The bird thus swims into the minute floating organisms which are sifted out from the water by the comb-teeth or lamellae fringing the bill. Sometimes it zigzags along on shallow water, head fully submerged to rake up the bottom mud; or up-ends like other surface-feeding ducks. Flight swift and teal-like, with a distinctive creaking rustle of wings in rising off the water and in the air. But its flesh is usually rank and unpalatable, making the bird unattractive to sportsmen from that point of view.

FOOD. Crustaceans, molluscs, water insects and larvae, fish spawn, worms, etc. Also a quantity of vegetable matter: shoots and corms of aquatic weeds, etc.

VOICE AND CALLS. Rather like Mallard's but lower and softer; also a low chuckling quack like Gadwall's.

♀ BREEDING. Extralimital. *Nest*, a hollow or depression in the ground in a meadow, amongst herbage, lined with grasses and down; occasionally in reed-beds. *Eggs*, 7 to 16, greenish buff. Average size of 100 eggs 52.2 ×

37.0 mm. (Baker). Incubation 23-25 days (Delacour). Layard's breeding record for Ceylon (March), when he is said to have caught most of the twelve ducklings accompanying the female, is incredible. It has been omitted by both Whistler (1944) and Phillips (1953).



Bill of Shoveller from side and above, $\times c. \frac{1}{2}$

MUSEUM DIAGNOSIS. For detailed description of plumages, structure, etc. see Witherby 1939, 3: 279-82.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	230-262	61-71	c. 32-38	c. 72-86 mm.
♀♀	217-238	56-64	—	—

(Baker)

Weight. ♂ 1 lb. 3 oz. to 1 lb. 14 oz. (c. 540-830 gm.); ♀ 1 lb. to 1 lb. 7 oz. (c. 450-650 gm.) — Hume.

COLOURS OF BARE PARTS. Iris ♂ yellow, orange, or orange-red; ♀ brown or orange-brown. Bill ♂ black or plumbeous black; ♀ browner, sometimes tinged with orange. Legs and feet orange, orange-brown, or orange-red.

MISCELLANEOUS. Longevity (from ringing data): c. 20 years. (Ring, 1962, 33: 148). Flight speeds: cruising 40 km.p.h.; chased 80 km.p.h. (Sprunt & Zim).

Genus RHODONESSA Reichenbach

Rhodonessa Reichenbach, 1853 (1852), Av. Syst. Nat. ix. Type, by original designation, *Anas caryophyllacea* Latham

Endemic. Monotypic. Apparently related to *Anas* more closely, than to any other duck genus; to some extent maybe also to the Pochards especially the Red-crested, *Netta rufina*, which it resembles both in proportions and in possession of a similar trachea (see Delacour). Superficially, from the longer and thinner neck, high position of the eye, and the very gradual slope of the forehead, Tickell had earlier considered it more allied to the Whistling Teal (*Dendrocygna*) than to *Anas*.

For anatomical details see Humphrey, P. S. and Ripley, S. D., 1962, *Postilla*, 61: 1-21, suggesting closer affinity to Aythyinae than Anatinae.

106. **Pinkheaded Duck.** *Rhodonessa caryophyllacea* (Latham)*Anas caryophyllacea* Latham, 1790, Index Orn., 2: 866 (India)

Baker, FBI No. 2249, Vol. 6: 390

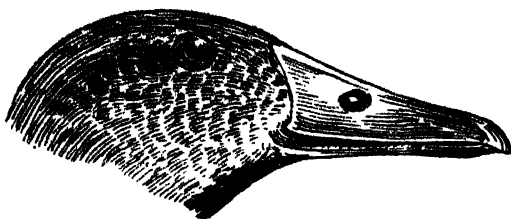
Plate 9, fig. 1, facing p. 176

LOCAL NAMES. *Gulāb sir*, *Lāl sirā* (Hindi); *Lāl sir*, *Saknal* (Bengal); *Damrar*, *Dūmr* (Nepal terai and Tirhut).

SIZE. Domestic duck; length c. 60 cm. (24 in.).

FIELD CHARACTERS. Shape and carriage of head and neck reminiscent of Whistling Teal. Colour pattern unique.

Male (adult). Brownish black above and below, with the partially tufted head, hindneck, and bill bright pink — the colour of new blotting paper. In flight, light pinkish buff speculum and pale shell-pink underwing (contrasting with dark body) prominent.



× c. 1

Female (adult). Overall blackish brown with pale brownish buff speculum. Head merely suffused with pink, the pink area less bright and not sharply demarcated as in male.

Young (immature). 'Head and neck pale rose-whitish colour, with the top of the head, nape, and hindneck brown; the whole plumage lighter brown; the underparts pale dull brown, with the edges of the feathers whitish' (Salvadori).

Chick (in down). Unknown.

STATUS, DISTRIBUTION and HABITAT. Probably extinct. Last authentic sight record (C. M. Inglis) from Darbhanga, Bihar, June 1935. Apparently local and nowhere common even during the 170 years since first described; to some extent locally migratory. Was presumably resident in Assam ('Flocks on several occasions at Nowgong' 1921-3, — Higgins, JBNHS 36: 417), Manipur, Bengal, Bihar, and Orissa, but stragglers recorded in winter sporadically from as far afield as Lucknow (U.P.), Rupar (Ambala dist., Punjab), Delhi, Mhow (M.P.), Jalna (?), Khandala area (?), Ahmednagar (Maharashtra), Nellore (Andhra), and Pulicat Lake (Madras). In its residential range it affected *bheels* in the Himalayan terai (including Nepal) and duars, and swampy lowland grass jungles.

Extralimital. Burma.

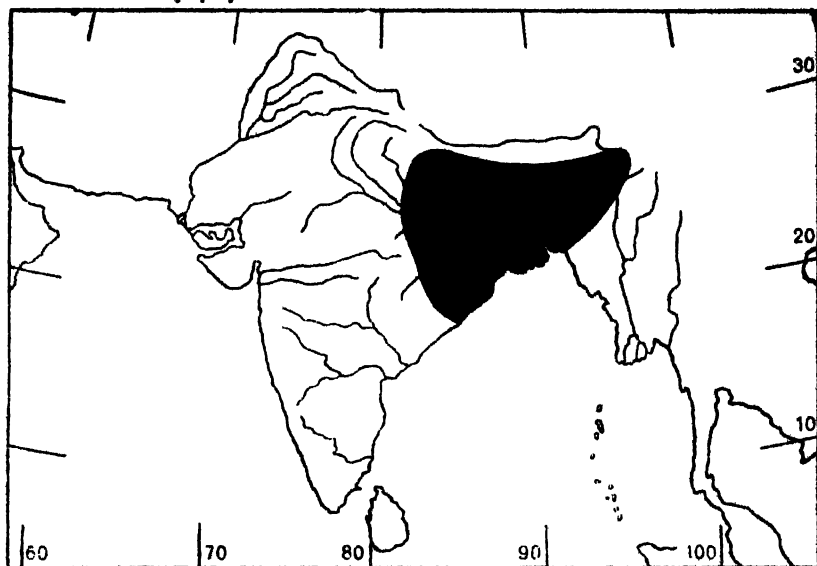
GENERAL HABITS. Little recorded except that the birds were shy and secretive, and seldom seen unless flushed by chance from ponds amongst tall grass jungle as by a line of elephants during tiger hunts. Usually small parties of up to 6 or 8 when not paired for breeding, but flocks of up to 30 and even 40 have been recorded. Feeding behaviour as of surface-feeding

ducks, e.g. Spotbill, but capable of diving like a Pochard on occasion. Sometimes perching on trees.

FOOD. In the gizzard of a specimen were found 'half-digested water weeds and various kinds of small shells' (Shillingford); therefore obviously omnivorous.

VOICE and CALLS (recorded in captivity). Of male a wheezy whistle recalling that of the mallards, but lower and weaker; of female a low quack (Delacour).

Rhodonessa caryophyllacea



■ Known (former) residential range

BREEDING. An anonymous writer in the defunct *Asian Sporting Newspaper* of 17 August 1880 (probably Shillingford) mentions taking its eggs in Purnea (Bihar) in June/July. *Nest* described as circular, well built of dry grass and a few feathers, without special lining. Diameter *c.* 9 inches (*c.* 23 cm.), depth 4–5 inches (*c.* 10–13 cm.) with wall 3–4 inches thick (*c.* 7–10 cm.). On ground, well hidden amidst tufts of tall grass, generally not more than *c.* 500 yards from water. *Eggs*, 5 to 10, ivory white, spherical, quite unlike those of other ducks in shape. Average size of 8 eggs from two different nests *c.* 44 × 41 mm. Two very round ones measured *c.* 43 × 42 mm. Both birds were flushed near a nest, so uncertain whether both sexes, or which, incubates. Shillingford has further described very realistic injury-feigning by a female to draw off intruders from the vicinity of young (or nest?).

MUSEUM DIAGNOSIS. For details of plumage see Baker, loc. cit.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♂	250–282	50–56	<i>c.</i> 40	100–131 mm.
♀ ♀	246–260	—	—	—

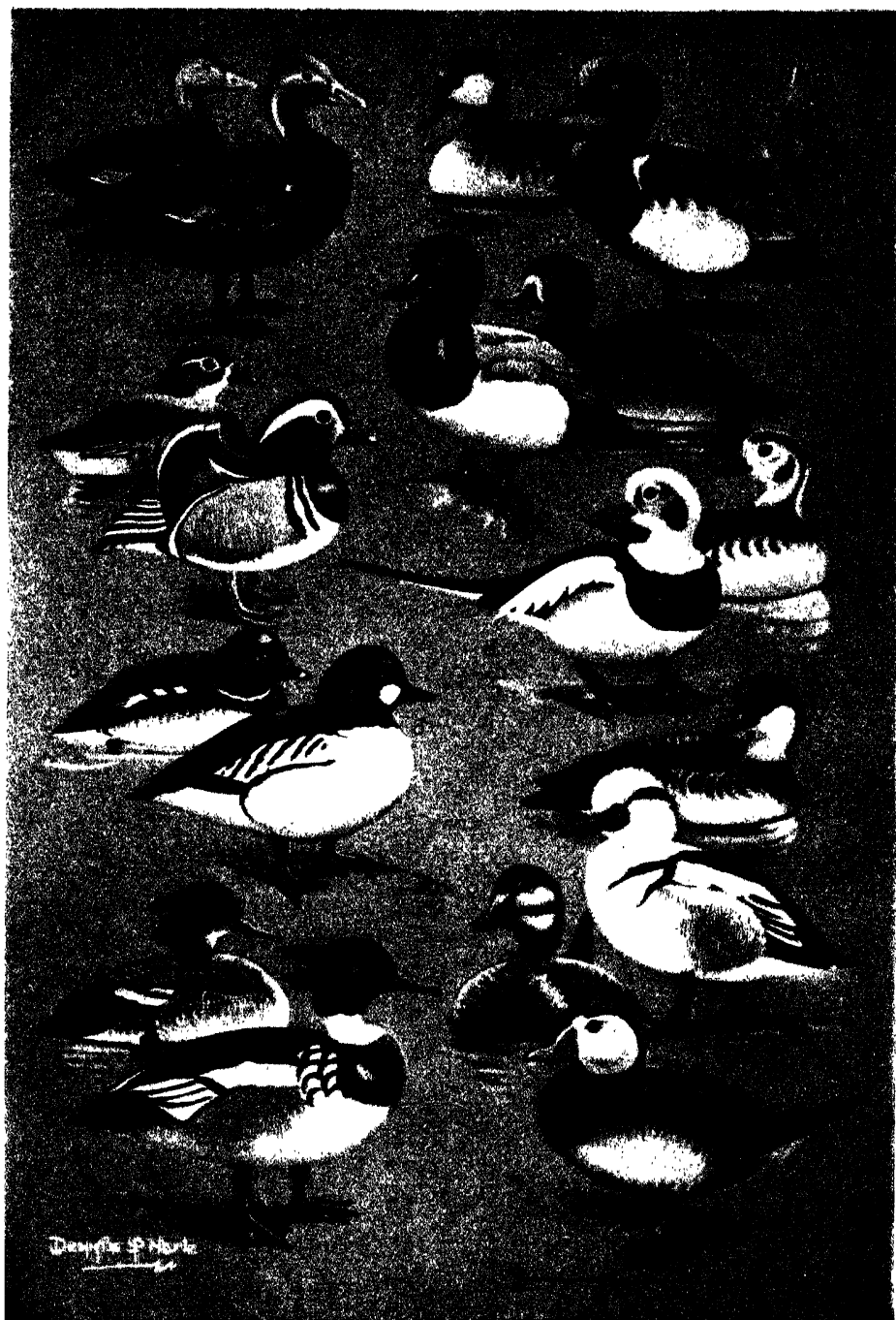


PLATE 9

1 *Rhodessa caryophyllacea*, Pinkheaded Duck (106). 2 *Netta rufina*, Redcrested Pochard (107). 3 *Anas gallericulata*, Mandarin Duck (113). 4 *Aythya marila*, Scaup Duck (112). 5 *Clangula hyemalis*, Longtail or Old Squaw Duck (117). 6 *Bucephala c. clangula*, Goldeneye Duck (118). 7 *Mergus albellus*, Sineu (119). 8 *Mergus serrator*, Redbreasted Merganser (122). 9 *Oxyura leucocephala*, Whiteheaded Stiff-tailed Duck (123).

Weight. 1 lb. 12 oz. to 2 lb. 3 oz. (c. 793–990 gm.) — Shillingford. 1♂ 3 lb.; 1 ♀ 3 lb. (c. 1,360 gm.) — Inglis.

COLOURS OF BARE PARTS. ♂ Iris light red or orange-red. Eyelids flesh-coloured. Bill dull to bright reddish pink or deep rose-colour, darker on ridge of culmen and gony, brighter and purer pink on nail and at base of both mandibles. Legs and feet reddish black. In ♀ colours same but duller.

MISCELLANEOUS. An inventory recently made of all specimens of the Pinkheaded Duck preserved in the major ornithological collections of Europe, Asia, and N. America revealed that there are probably not more than 80 skins in existence all told, excluding China whence information was unavailable. The oldest of these is dated 1825 (Paris Museum). The paucity of museum skins of this unique and much sought species may be taken as a measure of its rarity even in the last century when no considerations of conscience or conservation could have restrained the collectors' zeal. (Sálim Ali, 1960, *Wildfowl Trust 11th Annual Report*, 1958–9, pp. 55–60.)

Genus *NETTA* Kaup

Netta Kaup, 1829, Skizz. Entw.-Gesch. Eur. Thierw. : 102. Type, by monotypy, *Anas rufina* Pallas

Bill long, slightly tapering, very little raised at base; culmen nearly straight. Nostrils placed rather less than one-third length from base. Lamellae broad, prominent, and set rather far apart. Feathering at base of bill ending abruptly in a straight line almost at right angles to commissure. Feet large but less so than in true pochards (*Aythya*); hind toe broadly lobed. Wing comparatively short, pointed, and set far back on the body. Tail of sixteen feathers, short, cuneate. Sexes dimorphic. Male with a full bushy crest.

The species *N. rufina* occurs in temperate Europe, Asia, and N. Africa.

107. **Redcrested Pochard.** *Netta rufina* (Pallas)

Anas rufina Pallas, 1773, Reise Russ. Reich, 2: 713 (Caspian Sea)

Baker, FBI No. 2278, Vol. 6: 448

Plate 9, fig. 2, facing p. 176

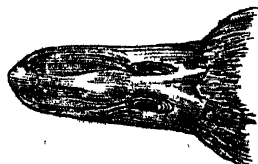
LOCAL NAMES. *Lāl chōnch*, *Lāl sir* (Hindī); *Bādā rāngāmuri*, *Hero hāns* ♂, *Chobra hāns* ♀ (Bengal); *Doommer* (Mirshikars, Bihar); *Dūmār* ♂, *Sānuwa* ♀ (Nepal); *Bātsha Rūtābo* (Sind); *Ratobari* (Gujarat, Nal Sarovar); *Deo hāns* (Assam); *Irupi* (= 'diver' — all pochards, Manipur).

SIZE. Domestic duck —; length c. 54 cm. (21 in.).

FIELD CHARACTERS.

Male (breeding). Head and silky mop-like crest chestnut and golden orange, with bright crimson bill. *Above*, body light brown, with white patches on shoulders, and white wing-mirror. *Below*, black, the flanks conspicuously white. In flight, red head and bill, black body, white flanks, white underside of wings with a white bar on the trailing edges are revealing clues.

Has frequently been misidentified as Pinkheaded Duck (both called *Dūmār* in Bihar and Nepal!) but golden orange head (v. bright rose-pink), brownish black underparts with large white patches on flanks (v. all-black) are diagnostic. Furthermore, being largely



x c. 1

a diving duck, is more likely to be seen on deepish open water while Pinkhead on wooded jheels, forest pools and swamps.

Male (in eclipse). Like female but browner on underparts and retaining bushy crest and bright-coloured eyes, bill, and feet.

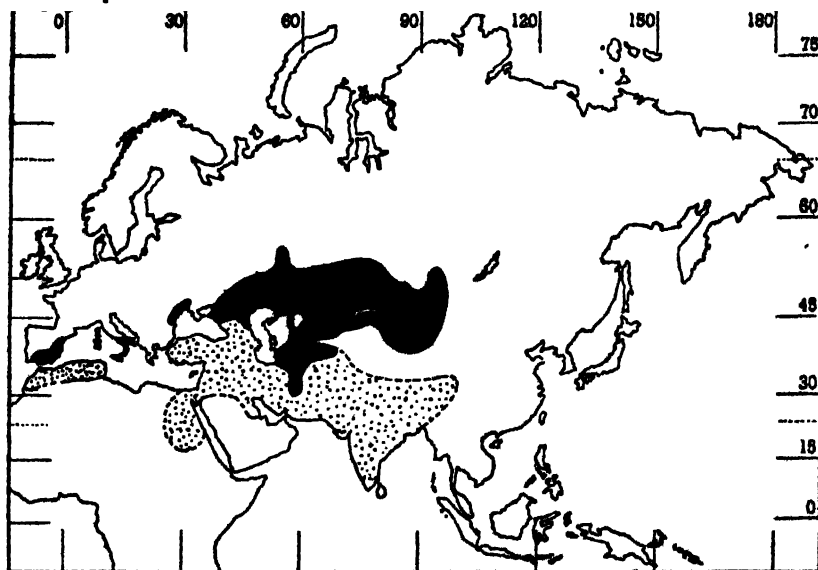
Female (adult). *Above*, dull sooty brown with dark brown (slightly mopped) crown, and nape, sharply demarcated from whitish (pale grey) face and foreneck. *Below*, excepting breast largely whitish.

Young (immature). Like female, the male browner and darker with dark brown centres to the underparts, and bushier head than in female.

STATUS, DISTRIBUTION and HABITAT. Winter visitor; arrives about October and mostly gone by mid-March. Common and locally abundant especially in West Pakistan and NW. India (recorded in Nepal Valley) decreasingly so eastward (rare in Assam); south to about the 20th parallel. Less common in the Peninsula, to Madras where fairly plentiful in some years. Not recorded further south in Mysore or Kerala, or for certain in Ceylon. Affects large jheels and reservoirs with plenty of submerged vegetation.

Extralimital. Breeds from southern France, Holland, through lower Danube, S. Russia east across Kirghiz steppes to W. Siberia. Winters in the Mediterranean region; Burma, Shan States to China.

Netta rufina



■ Breeding ▨ Non-breeding

MIGRATION. Ringing records suggest that our wintering birds are derived from a very widespread northern area. Two examples ringed in West Pakistan (Larkana district and Bahawalpur) were recovered respectively in Russian Turkestan (at 37°21'N., 66°20'E.) and near Lake Baikal in Siberia (c. 55°N., 105°E.).

GENERAL HABITS. Keeps more to fairly deep open water than to reedy marginal shallows, and obtains its food chiefly by diving, sometimes remaining submerged for many seconds and surfacing again with a peculiar abrupt

spring or pop-up. Often also up-ends in shallow water, like surface-feeding ducks, to reach the bottom mud and weeds. Occasionally walks about and grazes on marshy edges of jheels. Usually shy and wary, quick to take alarm, flying high and keeping well out of gunshot. The palatability of its flesh varies according to the diet on which it has been chiefly subsisting.

FOOD. Largely vegetarian: shoots, buds, rhizomes and seeds of aquatic weeds and grasses, e.g. *Sagittarius*. Also water insects, molluscs, tadpoles, etc. Hume records one that had gorged itself on fish about an inch in length.

VOICE. Very silent in winter. No calls recorded. In breeding male described as a 'hard wheeze, harsher than the Mallard's' (Delacour).

BREEDING. Extralimital. *Nest*, of reeds, rushes and grass thickly lined with down, placed among herbage at edge of swamps, etc. *Eggs*, 7 to 12 or 14, pale olive-grey. Average size of 90 eggs 57.8×42.4 mm. (Baker).

MUSEUM DIAGNOSIS. For details of plumages etc. see Witherby 1939, 3: 284-5 'When freshly shot the flanks and lesser coverts have a most beautiful salmon-pink tinge which, however, quickly fades' (Ticehurst).

Chick (in down). See Delacour 1959, 3: 49 (description), 140 (plate).

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	256-282	48-54	c. 40-45	c. 60-75 mm. (Baker)
♀♀	241-279	44-51		

Weight. ♂ 1 lb. 12 oz. to 2 lb. 14 oz. (c. 795-1305 gm.); ♀ 1 lb. 10 oz. to 2 lb. 6 oz. (c. 735-1080 gm.) — Hume.

COLOURS OF BARE PARTS. ♂ Iris bright red. Bill bright red, the nail paler. [Legs and] feet orange-yellow, more or less tinged with black. ♀ Iris reddish brown, becoming orange-red in spring. Bill greyish black, the edges and tip pale pink. Legs black, more or less tinged with pink (Delacour).

Genus AYTHYA Boie

Aythya Boie, 1822 (before May 1), Tagebuch Reise durch Norwegen : 308, 351.

Type, by monotypy, *Anas marila* Linnaeus

Nyroca Fleming, 1822, Philos. Zool., 2: 260. Type, by tautonymy, *Anas nyroca* Gldenstdt

Cf. Sharpe, 1899, Handlist, 1: 222-3. (*Aythya*, *Aristonetta*, *Fuligula*) Ibis, 1939: 521-2.

Bill of moderate length, rather more raised at the base than in *Netta*, uniformly broad throughout its length, or slightly broader at tip. Culmen slightly concave. Feathering at base of bill forming a convex line on commissure. Lamellae less prominent than in *Netta*, short, and set much further apart. Nostrils as in *Netta*. Character of wings, tail, and feet as in that genus, but the last much larger and placed farther back on the body.

Represented in India by five species, all migratory.

Key to the Species

	Page
A Bill wider at tip than at base.....	1
1 Head, neck, and breast black.....	a
Head, neck, and breast brown or brownish black.....	b
a Head crested, upperparts blackish.....	<i>A. fuligula</i> (♂) 185
Head not crested, upperparts white with black vermiculations....	
.....	<i>A. marila</i> (♂) 187

		Page
b	Wide white band around base of bill..... <i>A. marila</i> (♀)	187
	White band at base of bill indistinct or lacking..... <i>A. fuligula</i> (♀)	185
B	Bill same width at tip and base..... 2	
2	Wings lacking speculum..... c	
	Wings with white speculum..... d	
c	Head and neck chestnut, back and wings pale grey..... <i>A. ferina</i> (♂)	180
	Head and neck pale rufous, back and wings greyish brown..... <i>A. ferina</i> (♀)	180
d	Head, neck, and breast chestnut..... <i>A. nyroca</i> (♂)	182
	Head, neck, and breast dull brown. Chin and throat sometimes sprinkled with white..... <i>A. nyroca</i> (♀)	182
	Head and neck black glossed with green, breast chestnut..... <i>A. baeri</i> (♂)	184
	Head dark blackish brown with lighter chestnut patch behind bill. White diamond-shaped spot sometimes present on chin at base of lower mandible..... <i>A. baeri</i> (♀)	184

108. **Common Pochard.** *Aythya ferina* (Linnaeus)

Anas ferina Linnaeus, 1758, Syst. Nat., ed. 10, 1: 126 (Sweden)

Baker, FBI No. 2279, Vol. 6: 450

LOCAL NAMES. *Burār nār*, *Lāl sīr* (Hindi); *Rangā mūri*, *Lāl mūri* (Bengal); *Cheun* (Nepal); *Rangā mūriya* (Assam); *Irūpi* (Manipur); *Torāndo* (Sind); *Tarāndio* (Gujarat. Nal Sarovar); *Dhusanda* (Kutch).

SIZE. Domestic duck —; length *c.* 48 cm. (*c.* 18½ in.).

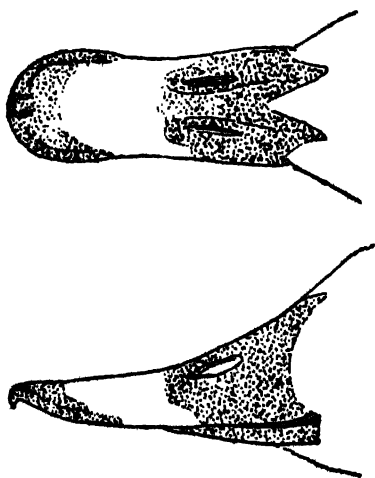
FIELD CHARACTERS. A rather squat, tubby duck.

Male (breeding). Head and neck chestnut-red. Upper back and breast black. Rest of upperparts light grey finely vermiculated with black. Rump, upper and under tail-coverts black. Underparts and sides largely greyish white. A dull grey speculum on wing.

Male (in eclipse). Head duller; black of upper back and breast replaced by brown.

Female (adult). Head, neck, upper back and breast rufous brown. Rest of back and scapulars greyish brown, faintly vermiculated. Lower parts mostly greyish brown. Buffy cheeks and throat, a buff mark around base of bill, and pale blue subterminal band on bill are further pointers.

In flight absence of white wing-bar (only inconspicuous dull grey) distinguishes both sexes from other pochards, and the female of this species from females of Scaup and Tufted Pochard (qq.v.).



Bill of adult male from above and side, $\times c. \frac{1}{2}$

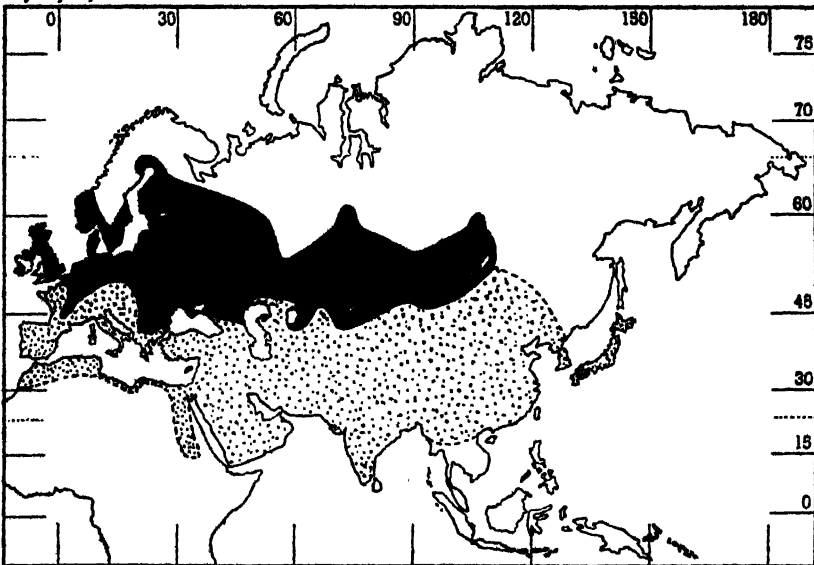
Young (immature). Like female, the male with head more reddish and paler, and underparts browner.

STATUS, DISTRIBUTION and HABITAT. Winter visitor, arriving in the north fairly late (c. mid-October) and mostly gone by end March. Common and abundant in W. Pakistan and NW. India, and across, more sparsely, to Assam, Manipur, and E. Pakistan. Occurs in Nepal; decreasingly southward in the Peninsula, irregularly to Mysore where not uncommon in some years. Not recorded farther south, or in Ceylon. Frequents the opener parts of jheels and irrigation reservoirs with submerged aquatic vegetation.

Extralimital. Breeds in British Isles, S. Scandinavia, and from eastern Russia through W. Siberia to Lake Baikal, south to Holland, Germany, Balkans, Black Sea, Kirghiz steppes and Yarkand. Winters in breeding range and south to Nile Valley; Burma, and S. China (Peter Scott).

MIGRATION. Two Common Pochards ringed in Madhya Pradesh (Dhar) and W. Pakistan (Bahawalpur) respectively, have been recovered in Siberia, between c. 53° & 55°N. and 76° & 84°E., indicating the provenance of at least a part of our wintering population.

Aythya ferina



Breeding

| Non-breeding

GENERAL HABITS. One of our commonest diving ducks; sometimes collecting in flocks and rafts of up to 300 or 400, to very large congregations of several thousand strong, e.g. on Manchar lake, Sind. Feeds chiefly under water; therefore usually seen on open expanses in the middle of tanks and jheels. Largely nocturnal where subjected to disturbance, flying to its feeding grounds at dusk and returning to the daytime refuge at dawn. Swims strongly rather low on the water; walks clumsily on land. Flight swift with rapid wing-strokes, but take-off rather slow and awkward preceded by some pattering along surface. Ranked normally amongst the finest ducks for the table.

FOOD. Largely vegetarian: rhizomes, buds, shoots and seeds of aquatic plants. Also crustacea, molluscs, water insects and larvae, worms, and occasionally tadpoles and small fish.

VOICE. Very silent in India. Nothing recorded.

BREEDING. Extralimital. *Nest*, a cup of flags, rush blades and reeds, thickly lined with down, placed on the ground among high reeds and rushes. *Eggs*, 6 to 14, dull greyish- or olive-drab. Average size of 160 eggs 60.6×42.9 mm. (Baker).

MUSEUM DIAGNOSIS. For details of plumages etc. see Witherby 1939, 3: 289-92. Chick (in down). See Delacour 1959, 3: 140 (plate).

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	210-225	43-50	c. 35-39	c. 54-76 mm.
♀♀	200-213			

(Baker)

Weight. ♂ 1 lb. 13 oz. to 2 lb. 5 oz. (c. 822-1052 gm.); ♀ 1 lb. 5 oz. to 2 lb. 4 oz. (c. 595-1025 gm.) — Hume.

COLOURS OF BARE PARTS. Iris yellow or reddish yellow. Bill: base and tip black; middle portion pale plumbeous-blue to dark slaty blue. Legs and feet variable slaty blue; webs and joints darker and blackish.

109. White-eyed Pochard or Ferruginous Duck. *Aythya nyroca* (Güldenstädt)

Anas nyroca Güldenstädt, 1770, Novi Comm. Sci. Petropol., 14: 403 ('... regionibus Tanaicensibus inter gradum 54°-55° ...' = S. Russia)

Baker, FBI No. 2280, Vol. 6: 453 (= *Nyroca rufa*)

LOCAL NAMES. *Kurchiya*, *Burār mādā* (Hindi); *Lāl bigri*, *Bhūti hāns* (Bengal); *Būruu*, *Būriuo* (Sind); *Tamni* (Gujarat, Nal Sarovar); *Malak* (Nepal terai); *Kāli mūri* (Assam); *Irūpi* (Manipur).

SIZE. Domestic duck —; length c. 41 cm. (16 in.).

FIELD CHARACTERS.

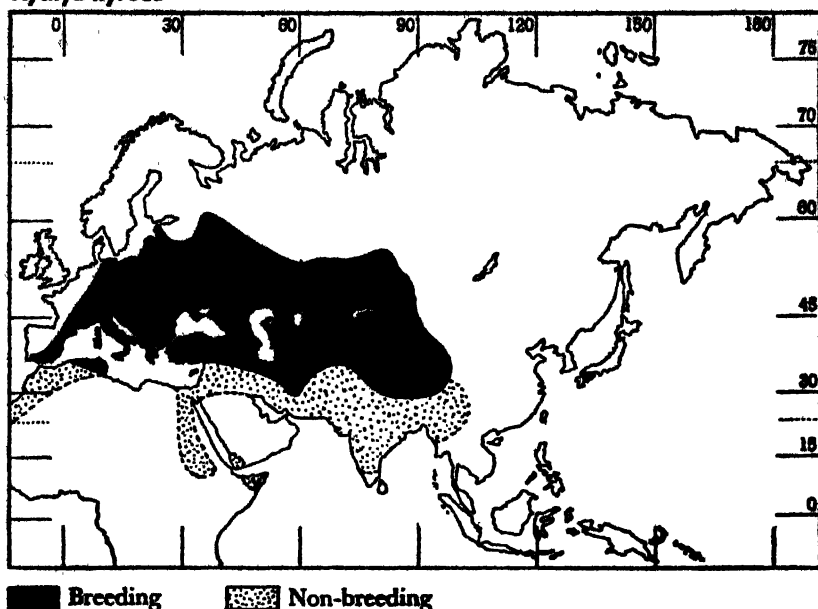
Male (breeding). Overall aspect of plumage rich rufous-brown and blackish brown, with a large white oval patch on belly, white speculum, and white under tail-coverts. At short range white eye conspicuous.

Male (in eclipse). Head, neck, and breast dull reddish with sandy borders to feathers of lower neck. Mantle brown.

Female (adult). Similar to male but duller — brown rather than chestnut — with the belly less contrasty off-white and not sharply demarcated at the edges. Eye brown.

In flight the chestnut colour, white oval belly-patch, white under tail-coverts, and broad white crescentic band on flight feathers (outer secondaries) diagnostic in both sexes.

Young (immature). Like female but more uniformly brown, with silvery brown underparts and brownish grey eyes.

Aythya nyroca

STATUS, DISTRIBUTION and HABITAT. Breeds in Kashmir and Ladakh; winter visitor elsewhere. Common in W. Pakistan and N. India, and practically the entire Union; Nepal (Valley chiefly on passage; bhabar winter). Less common to rare in Bengal, Assam, Manipur, E. Pakistan. Sparsely in the Deccan south to Mysore and Kerala (on coastal backwaters and lagoons). No record from eastern side of the Peninsula south of Madras, or Ceylon. Affects weedy and rush-covered jheels as well as more open irrigation tanks, the latter chiefly as daytime refuges and foraging bases.

Extralimital. 'Breeds in S. Europe, Balkans, Poland and W. Siberia to the Ob Valley, south to N. Africa, Persia, Turkestan, Kashmir, the Pamirs, and S. Tibet. Winters, in the Mediterranean region, Nile Valley, Persian Gulf, India, and Burma' (Peter Scott).

MIGRATION. An adult ringed in W. Pakistan (Karachi district) in winter (January) was recovered at $44^{\circ}34'N.$, $66^{\circ}7'E.$ in the Syr Daria region of Kazakh SSR, three years later. As this was at the end of April it is uncertain whether the bird had already arrived on its breeding-grounds.

GENERAL HABITS. Similar to those of the Common Pochard and others of the genus. In coastal areas, and in the Kerala backwaters, often spends the daytime riding on the sea beyond the surf, safe from disturbance by passing boats, flying inland at dusk to feed in outlying tanks and paddy-fields and returning to the diurnal refuge at dawn. Is an expert diver and underwater swimmer, procuring most of its food thus, and difficult to retrieve from the water if shot and only winged.

FOOD. Vegetable as well as animal: corms, shoots, leaves, and seeds of aquatic plants; crustaceans, molluscs, water insects and larvae, worms, frogs and small fish.

VOICE. A peculiar harsh *kirr-kere*, *kirr* uttered both as it flushes from the reeds and when walking about and feeding in a marsh (Hume).

BREEDING. Within our limits only in Kashmir and Ladakh at about 1500 metres altitude on the Hokarsar, Dal, and other lakes. *Season*, May to June/July. *Nest*, a pad of rushes *c.* 25–35 cm. across and 10–12 cm. in depth, thickly lined with finer grasses and down feathers, with a deep depression for the eggs. Built among reed-beds close to the water's edge. *Eggs*, 6 to 12 — usually 8–10 — pale buff or *café-au-lait*, moderately broad regular ovals, smooth and fine-textured. Average size of 150 eggs 51.7×37.9 mm. (Baker). 'Incubation 25–27 days' (Delacour). The account from Hume's time of 'boatloads' of its eggs being brought by Kashmiri fishermen for sale as food in the Srinagar bazaar seems difficult to credit in view of the low numerical status of the breeding population today. As has been suggested, these boatloads possibly comprised a mixed bag of all marsh-birds' eggs including Mallard, coots, moorhens, and others.

MUSEUM DIAGNOSIS. For details of plumages see Witherby 1939, 3:294–6. For differentiation from the superficially similar Eastern White-eye (*Aythya baeri*) see under that species and Key.

Chick (in down). See Delacour 1959, 3: 71 (description); 140 (plate).

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♂	174–192	40–43	29–32	48–58 mm.
♀ ♀	176–185	36–40	—	—

(Witherby)

Weight. ♂ 1 lb. 2 oz. to 1 lb. 9 oz. (*c.* 510–710 gm.); ♀ 1 lb. 3 oz. to 1 lb. 6 oz. (*c.* 540–625 gm.) — Hume.

COLOURS OF BARE PARTS. Iris ♂ white, occasionally yellow; ♀ brown. Bill dull slaty or bluish black. Legs and feet dull dark slaty tinged with grey or green, sometimes mottled about the joints.

110. Baer's Pochard or Eastern White-eye. *Aythya baeri* (Radde)

Anas (Fuligula) Baeri Radde, 1863, Reise Süd von Ost-Siberien, 2:376, pl. 15

(upper Salbatch Plain, middle Amur River, Siberia)

Baker, FBI No. 2281, Vol. 6:454

LOCAL NAMES. *Bādā bhūti hāns* (Bengal); *Bor kāli mūri* (Assam).

SIZE. Domestic duck —; length *c.* 46 cm. (18 in.).

FIELD CHARACTERS.

Male (breeding). Similar to Ferruginous Duck (No. 109) but whole head and neck black glossed with green, grading into rich rufous-chestnut on breast.

Male (in eclipse). Duller, with head and neck unglossed brownish black like female.

Female (adult). Head and neck dull blackish brown without metallic gloss. A chestnut patch on face near bill. On the whole very like female 109, and if unaccompanied by ♂, doubtfully distinguishable from it in the field.

Young (immature). Like female, but browner.

STATUS, DISTRIBUTION and HABITAT. Uncommon and erratic winter visitor to Manipur (fairly regular), Assam, W. Bengal, and E. Pakistan. Has occurred also in Bihar. Possibly less rare in these areas than records indicate, but casually overlooked among sportsmen's bags of white-eyes, both species being found together and the females superficially so alike.

Extralimital. Breeds from Transbaikalia to the lower Ussuri and the Amur; Kamchatka (?). Winters in China, Korea, Japan, upper Assam, and Burma (Peter Scott).

MIGRATION. Nothing known.

GENERAL HABITS. Little recorded except that it is stronger and faster on the wing than the Ferruginous Duck.

FOOD and VOICE. Not specifically described.

BREEDING. Extralimital. Little known.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂♂	210-233	48-50	36-38	67-72 mm.
♀♀	186-203	47-48	—	—

(Delacour)

COLOURS OF BARE PARTS. Iris ♂ white or golden yellow; ♀ brown. Bill slaty blue, the basal third, tip, and nail blackish. Legs and feet grey, the joints and webs darker.

111. **Tufted Duck.** *Aythya fuligula* (Linnaeus)

Anas fuligula Linnaeus, 1758, Syst. Nat., ed. 10, 1:128 (Sweden)

Baker, FBI No. 2283, Vol. 6:458

Plate 1, fig. 7, facing p. 16

LOCAL NAMES. *Dūbāru*, *Āblāk*, *Rāhwārā* (Hindi); *Turando*, *Runharo* (Sind); *Kālūw-lio* (Gujarat, Nal Sarovar); *Malak* (Nepal terai); *Nāllā chilūwa* (Telugu); *Bāmuniya hāns* (Bengal, Assam).

SIZE. Domestic duck —; length c. 43 cm. (17 in.).

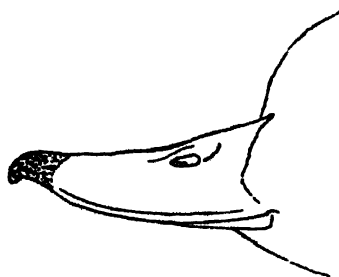
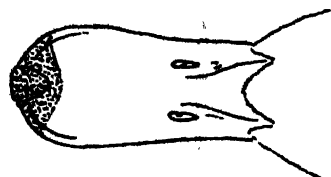
FIELD CHARACTERS.

Male (breeding). Plumage boldly contrasting black and white. Jet-black head, neck, breast, back, tail, and vent; pure white flanks and sides of body. White wing-mirror (speculum). A limp occipital tuft (prominent in profile) and yellow eye, additional clues. In flight a broad white band along trailing edge of wings in both sexes conspicuous.



X c. 1/2

Male (in eclipse). Upperparts duller and browner, and dusted with white. Chin and throat mottled with white; lower breast with crescentic white mottling. Sides and flanks pale brown vermiculated whitish.



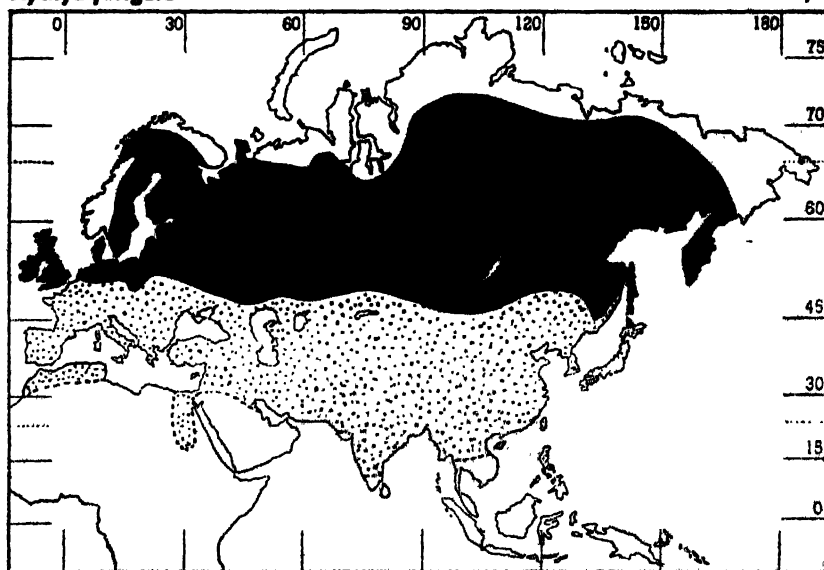
Bill of adult male from above and side, $\times c. \frac{1}{2}$

Female (adult). Dark brown replaces black parts of male. White of lower plumage sootier, less in extent, and diffused at edges (not clear-cut). Tuft rudimentary. Sometimes a white ring of feathers at forehead around base of bill but much narrower than in Scaup (q.v.). Rather variable in details.

Young (immature). Male like adult female, but with mantle feathers more dusted with white, underparts more uniform brown, the belly barred with white. Young female more uniform brown.

STATUS, DISTRIBUTION and HABITAT. Winter visitor arriving about mid-October and mostly gone by end March. Common in W. Pakistan and N. India (rare in Kashmir; on passage?) including Nepal Valley and lowlands, east to Assam, Manipur, and E. Pakistan, south to about the 20th parallel (Madhya Pradesh, Orissa). Decreasingly in the Deccan and farther south to Mysore (rare). Rare vagrant in Ceylon (1 record), and Maldiv Islands. Has been recorded on high-altitude tarns and lakes (up to $c. 5330$ m.) in E. Nepal and Sikkim, March through May, presumably on northward

Aythya fuligula



| Breeding ■ Non-breeding

emigration. Affects opener and deeper tanks and irrigation reservoirs than White-eyed Pochard, and expanses of open water in the middle of jheels.

Extralimital. Breeds in Europe and Asia from Iceland and the British Isles to the Commander Islands (Pacific), south to central Europe, Balkans, Kirghiz steppes, Lake Baikal, the Amur and Sakhalin. Winters in southern half of breeding range and south to Nile Valley, Persian Gulf, S. China and Philippines (Peter Scott).

MIGRATION. No ringing data.

GENERAL HABITS. Not appreciably different from the Common and White-eyed Pochards (qq.v.), likewise procuring its food chiefly by diving. Rides rather low on water, often with only top of back visible, as in cormorant. Occasionally in very large flocks, or rafts, of several hundred on open tanks.

FOOD. Both animal and vegetable matter as in other pochards.

VOICE. Mostly silent in its winter quarters. A harsh, low *kur-r-r*, *kur-r-r*, uttered in flight.

MUSEUM DIAGNOSIS. For details of plumages etc. see Witherby 1959, 3: 300-2 Chick (in down). See Delacour 1959, 3: 77 (description); 140 (plate).

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	192-208	37-44	33-37	c. 49-58 mm. (Baker)
♀♀	189-202	37-42		

Weight. ♂ 1 lb. 8 oz. to 2 lb. 4 oz. (c. 680-1025 gm.); ♀ 1 lb. 4 oz. to 1 lb. 10 oz. (c. 568-795 gm.) — Hume.

COLOURS OF BARE PARTS. Iris bright yellow. Bill greyish blue or bluish slate to dull dark plumbeous; nail and tip black. Legs and feet same as bill; joints darker, webs almost black.

112. Scaup Duck. *Aythya marila marila* (Linnaeus)

Anas Marila Linnaeus, 1761, Fn. svec., ed. 2: 39 (Lapland)

Baker, FBI No. 2282, Vol. 6: 456

Plate 9, fig. 4, facing p. 176

LOCAL NAMES. Doubtfully differentiated from 111.

SIZE. Domestic duck —; length c. 46 cm. (c. 18 in.).

FIELD CHARACTERS.

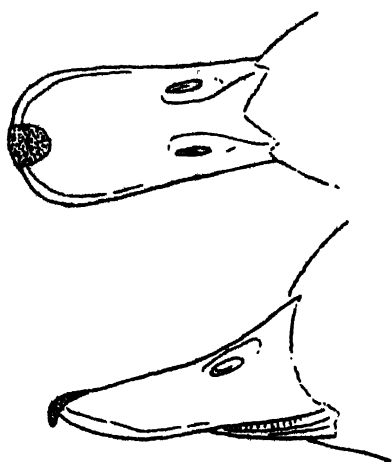
Male (breeding). Very similar to Tufted Duck, the black parts glossed with purple but black back replaced by vermiculated pale grey. Occipital tuft lacking.

Male (in eclipse). Like adult female, but upperparts more heavily vermiculated and pure white facial band absent. Speculum whiter and more pronounced than in female.

Female (adult). Dark brown, closely resembling female Tufted, but always with a sharply defined white band at forehead around base of bill, broader and more prominent than in similar Tufted females.

Eye colour and wing pattern in both sexes same as in Tufted Duck.

Young (immature) male like adult female, but darker and richer brown. Facial band much less in extent, or wanting.



Bill of adult male from above and side, $\times c. \frac{1}{2}$

STATUS, DISTRIBUTION and HABITAT.

Rare vagrant in winter. Has occurred in W. Pakistan (Attock, Karachi ?), Salt Range, Kashmir, Kulu, Punjab, Delhi (Gurgaon), Nepal, Uttar Pradesh, Bihar (Monghyr), W. Bengal (Calcutta), E. Pakistan (Chittagong), Assam (Dibrugarh, Lakhimpur), Manipur (near Imphal), Gujarat (Bhavnagar), Maharashtra (Panvel, Ahmednagar). Not south of 19°N . latitude. Some young birds in duck hunters' bags possibly mistaken for other pochards and escape record. Elsewhere largely a sea duck; in India taken on freshwater lakes.

Extralimital. 'Breeds in N. Europe and Asia (eastern limits not yet determined). Winters on coasts of W. Europe (including Britain), eastern Mediterranean,

Black Sea, Persian Gulf, NW. India' (Peter Scott).

GENERAL HABITS. Very little recorded in India, and nothing to suggest any appreciable difference from Tufted Duck in habits, food or voice.

BREEDING. Extralimital. Nest and site as in Tufted Duck. *Eggs*, 7 to 12, olive-drab. Average size of 150 eggs 62.7×43.8 mm. (Baker). Incubation 23–27 days (Delacour).

MUSEUM DIAGNOSIS. Female differentiated from female Tufted Duck by broader, sharply defined white band around base of bill, larger wing, and longer, broader bill. For details of plumages see Witherby 1959, 3: 305–7.

Chick (in down). See Delacour 1959, 3: 140 (plate).

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	217–235	c. 43–47	34–38	45–63 mm. (Baker)
♀♀	209–225	c. 40–46		

Weight. ♂ ♀ 1 lb. 12 oz. to 2 lb. 8 oz. (c. 795–1135 gm.) — Hume.

COLOURS OF BARE PARTS. Iris yellow or golden yellow. Bill greyish blue to dull slaty grey; nail black. Legs and feet greyish blue to dull slaty, darker on joints; webs and claws black.

MISCELLANEOUS. Longevity (from ringing data): c. 13 years (Ring, 1962, 33: 148).

Genus *Aix* Boie

Aix Boie, 1828, Isis, 21, col. 329. Type, by subsequent designation, *Anas sponsa* Linnaeus (Eyton, 1838, Monogr. Anat.: 35)

Foreneck feathers in male much elongated, forming a conspicuous ruff. Innermost secondary highly ornamental, very broad and long. Head crested. Culmen short,

nearly straight. Legs placed well forward; tarsus short; claws sharp enabling the birds to climb steeply inclined tree-trunks and boughs. For further details see Delacour 1959, 3: 99-100.

113. **Mandarin Duck.** *Aix galericulata* (Linnaeus)

Anas galericulata Linnaeus, 1758, Syst. Nat., ed. 10, 1: 128 (China)

Baker, FBI No. 2251, Vol. 6: 394

Plate 9, fig. 3, facing p. 176

LOCAL NAME. None.

SIZE. Domestic duck —; Common Teal +; length *c.* 44 cm. (*c.* 17 in.).

FIELD CHARACTERS.

Male (breeding). A multicoloured, highly ornamental little duck — orange-buff, metallic bronzy and coppery blue, green, purple, cinnamon, and chestnut. Sides of face greyish buff, bordered above by white supercilium from bill to nape. A long, thick metallic purple nuchal crest falling over upper back. Enormously broadened fan-shaped tertiary feathers, steel blue and orange-chestnut, upstanding like sails (or like exaggerated tail-fins of an aeroplane). Lower neck and sides of breast brilliant purple-copper. Sides of lower breast with a composite band of 3 black and 2 white stripes — a broken pectoral band. Altogether a unique combination of feather structure and colour, seen in no other duck.

Male (in eclipse). More or less like female, but more glossy. Bill remains reddish and legs yellow.

Female (adult). *Above*, head and mop-like crest grey, with a white ring round eye continued as a streak behind it. Rest of upperparts olive-brown. A deep blue-green wing speculum margined with black and white. *Below*, chin, throat, and upper neck white. Lower neck, breast, sides, and flanks olive-brown broadly mottled paler. Rest of underparts white.

Young (immature). 'Like females only more uniform brownish grey, the male with less conspicuous eye markings' (Delacour).

STATUS, DISTRIBUTION and HABITAT. Exceptional vagrant. Only taken twice within our limits: a specimen in Assam (Lakhimpur dist.) and four in one day in Manipur (Mayangthang Valley, *c.* 930 m.). The latter in March 1934 on a small stream with occasional high grassy pools along its bed. Stuart Baker once observed a party of six birds also in Lakhimpur district, Assam.

Extralimital. E. Asia from the Amur and Ussuri, south through Korea, E. China, Japan to Formosa (Taiwan).

GENERAL HABITS. In its residential range associates in small flocks of a dozen or so, frequenting and feeding in forest streams and ponds. Perches freely in tall trees, 'whole families together exactly like a family of rooks or crows' (Sowerby). Is a strong flier (reminiscent of Common Teal) and good swimmer; walks well but dives poorly.

FOOD. Animal and vegetable matter. Particulars not recorded.

VOICE. Said to utter 'a peculiar whistling note'.

BREEDING. *Extralimital.* *Nest*, of grass, thickly lined with down, in holes in trees by forest streams. *Eggs*, 9 to 12, buffy stone colour, glossy. Average size 49 × 36.5 mm. Incubation 28-30 days (Delacour).

MUSEUM DIAGNOSIS. For fuller description of plumage see Baker, loc. cit. Chick (in down). See Delacour 1959, 3: 106 (description); 140 (plate).

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂♂	220-235	27-31	35-42	110-115 mm.
♀♀	217-230	26-30	—	—

(Delacour)

COLOURS OF BARE PARTS. Iris dark brown with a yellow outer ring. Bill red (pink in some females); nail fleshy pink. Legs orange-buff.

MISCELLANEOUS. The Mandarin duck occupies an important place in Japanese folklore and art as a symbol of marital fidelity, on a par with the Sarus crane in India. In Japanese paintings and embroidery the ornate male is seldom depicted alone; traditionally he is always accompanied by his plain-coloured spouse (Austin & Kuroda, 1953).

Genus NETTAPUS Brandt

Nettapus Brandt, 1836, Descr. Icon. Anim. Ross. Nov., Aves, fasc. 1: 5. Type, by monotypy, *Anas madagascariensis* Gmelin = *Anas aurita* Boddaert

Distinguished by small size and short goose-like bill, high at base narrowing gradually in front. Nostrils small, oval, situated near base of commissure. Legs short; hind toe narrowly but distinctly lobed. Wings pointed. Tail rounded. Sexes dimorphic.

114. Cotton Teal or Quacky-duck. *Nettapus coromandelianus coromandelianus* (Gmelin)

Anas coromandelianus Gmelin, 1789, Syst. Nat., 1(2): 522 (Coromandel, India)

Baker, FBI No. 2250, Vol. 6: 392

Plate 4, fig. 3, facing p. 64

LOCAL NAMES. *Girri*, *Girria*, *Girja* (Hindi); *Gürgūra* (Etawah); *Bali hāns* (Bengal); *Bhullia hāns* (E. Pakistan); *Dāndāna* (Orissa); *Ade*, *Atla* (Ratnagiri); *Naher*, *Keeke*, *Chuwa* (Nowgong, Assam); *Bahēr*, *Kārārhi* (Sind).

SIZE. Partridge; length c. 33 cm. (13 in.).

FIELD CHARACTERS. The smallest of our ducks; with a short stubby goose-like bill.

Male (breeding). Crown and back blackish brown, the latter glossed with purple and green. Face, neck and underparts white, with a prominent black collar round base of neck, and white wing-bar. In flight diminutive size, predominatingly white plumage, and white bar on trailing edge of wing diagnostic.

Male (in eclipse) like female but upperparts darker and wing-bar prominent as in breeding dress.

Female (adult), duller and browner with less contrasty white in plumage. White wing-bar less prominent. A dark line through eyes.

Young (immature). Like female but more brown about the head and more banded with light brown on flanks. Wing-bar in males more prominent.



× c. 1

STATUS, DISTRIBUTION and HABITAT. Resident but local, practically throughout the Indian Union, both Pakistans, Nepal terai, Ceylon, and Andaman Is. Plains to *c.* 300 metres altitude. Commonest in deltaic W. Bengal and E. Pakistan. Rare or absent in arid portions of W. Pakistan, Punjab, and Rajasthan. Not recorded from Kerala. Subject to local movements dependent on water conditions. Affects vegetation-covered jheels, village tanks, and ponds; also shallow lagoons, e.g. 'Salt Lakes', Calcutta.

Extralimital. Burma, east to S. China, south to Malaya and north-western East Indies (Peter Scott).

MIGRATION. Evidently locally migratory to some extent, but no precise indication.

GENERAL HABITS. Usually pairs in breeding season; small flocks from 5 to 15, occasionally up to 50 or more, at other times 'up to 500' in Mysore (Phythian-Adams). Tame and confiding where unmolested, e.g. on secluded village tanks; exceedingly wild where persecuted by hunters. Flight strong and swift with rapid whirring wing-beats, usually with a great deal of agile turning and twisting, fairly low over water and skimming the tree-tops. Feeds on surface but can dive creditably to avoid capture when winged by shot or while moulting flight feathers. Clumsy on land.

FOOD. Mainly vegetarian: shoots, corms, seeds of aquatic plants, grains of cultivated and wild rice (known as *pasai* in U.P.), etc. Also crustacea, worms, and insects and their larvae.

VOICE. A peculiar short, sharp, chuckling cackle, rendered by Col. Tickell as resembling the words '*Fix baggonets! Fix baggonets!*', uttered chiefly on the wing.

BREEDING. *Season*, June to September — mainly July and August — in N. India; February to August in Ceylon. *Nest*, a natural hollow in a tree-trunk standing in or near water, 2 to 5 metres above water level. Occasionally a hole in a building. Unlined or scantily so with grass, feathers, and rubbish; no down. One nest recorded in a box-like hole in the coping of Government House, Rangoon, in 1924, 68 feet (*c.* 20 m.) above ground. *Eggs*, normally 6 to 14 (once 22, probably product of more than one female), pearly white, becoming stained and dirty during incubation. Short broad ovals, equal at both ends; fine and close-textured. Average size of 100 eggs 43.1 × 32.9 mm. Incubation by female alone (?); period 15–16 days from last egg (Baker).

In the case of the Rangoon nest, the thirteen ducklings were pushed out of nest-hole by parent, dropped like stones for some distance, then fluttered to break fall, and reached ground safely. Elsewhere female has also been observed carrying down duckling on her back (H. S. Wood).

MUSEUM DIAGNOSIS

Chick (in down). Dark greyish brown above, with large white patches on scapulars, wings, flanks, and sides of rump. Cap black; hindneck greyish. Rest of head and neck white; a black streak through eye continued over hindneck. Underparts pale buff. See Delacour 1959, 3: 140 (plate).

MEASUREMENTS

	Wing	Bill	Tarsus	Tail
♂♂	152–167	22–24	23–25	72–75 mm.
♀♀	150–153	20–23	—	—

(Delacour)

Weight. ♂ c. 8 to 11 oz. (c. 255–312 gm.); ♀ 6½ to 9 oz. (c. 185–255 gm.) — Hume.

COLOURS OF BARE PARTS. Iris ♂ red-brown; ♀ brown. Bill ♂ black; ♀ brown or dark olive, yellowish on lower mandible and gape. Legs and feet blackish brown or black.

Genus *SARKIDIORNIS* Eyton

Sarkidiornis Eyton, 1838, Monogr. Anat.: 20. Type, by original designation, *Anser melanotos* Pennant

Bill of moderate length furnished in the male with a fleshy knob on the base which becomes greatly swollen in the breeding season. Tail of twelve feathers, long and graduated. Hind toe narrowly lobed. A spur on shoulder of wing.

Tropical; found in America, Africa, Madagascar, east to Burma and the Indo-chinese subregion. A single species in India.

115. **Nakta or Comb Duck.** *Sarkidiornis melanotos melanotos* (Pennant)

Anser melanotos Pennant, 1769, Ind. Zool.: 12, pl. 11 (Ceylon)

Baker, FBI No. 2247, Vol. 6: 385

Plate 4, fig. 1, facing p. 64

LOCAL NAMES. *Nakta* (Hindi; Bengal); *Nākiva* (Bihar); *Nāki hānsa* (Orissa); *Juttu chiluva* (Telugu); *Dodda sarle hākki* (Kannada); *Kāro hānj* (Sind); *Kabalittiya* (Sinhala); *Mookkūn thārā* (Tamil).

SIZE. Domestic duck +; length c. 76 cm. (30 in.).

FIELD CHARACTERS. A large perching duck of superficially similar colour pattern to Cotton Teal.

Male (adult). Upper back black, glossed with blue-green and purple. Lower back grey, conspicuous in flight. Head and neck white, speckled with black. A black half-collar down side of breast; another similar black band descending in front of under tail-coverts. Wing speculum (secondaries) bronze. A curious fleshy knob, or comb, on base of bill at forehead, becoming greatly swollen in breeding season.

No eclipse plumage.

Female (adult). Like male, but without comb on bill and considerably smaller and duller. Underparts somewhat mottled with brown and lacking demi-collar on upper breast, and band near tail.

Young (immature), differs from female in being less glossy on black upperparts. White of hindneck sullied with brown and barred with blackish. Lower back and rump dull greyish white; upper tail-coverts and tail dull brown (Whistler).

STATUS, DISTRIBUTION and HABITAT. Resident, shifting locally with water conditions. Rare in southern and eastern Sind; absent elsewhere in W. Pakistan. Occurs practically in all India and E. Pakistan, east through Assam, south to Mysore (rare). Not recorded in Nepal. Formerly sparse resident in Ceylon; now believed extinct as no record in present century. Affects reedy banded tanks and jheels in well-wooded plains country.

Extralimital. 'Africa from Gambia and the Sudan, south to the Cape and Madagascar; Burma and SE. China' (Peter Scott).

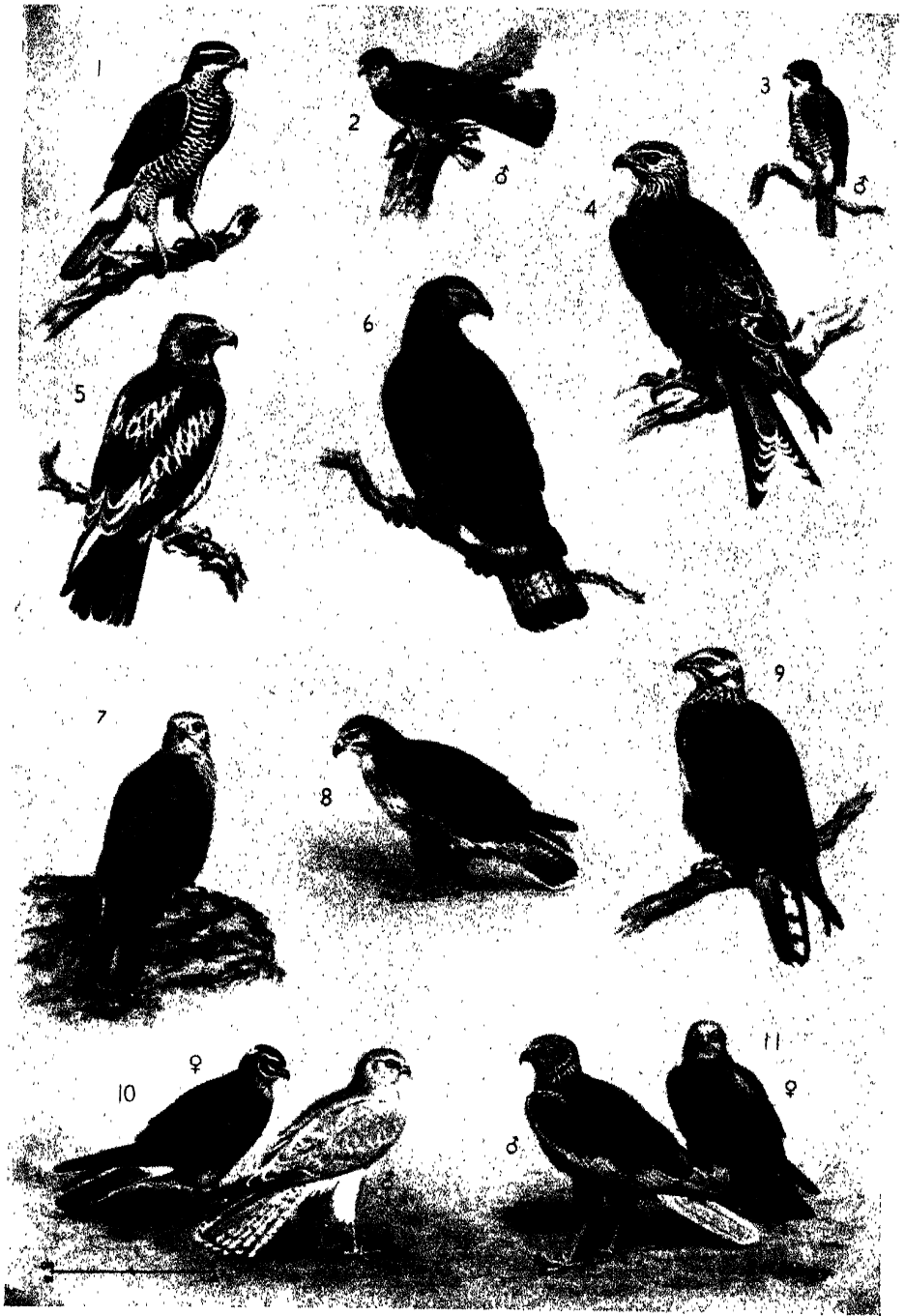


PLATE 10

1 *Accipiter g. schwedowi*, Goshawk (136). 2 *Accipiter n. melaschistos*, Indian Sparrow-Hawk (148). 3 *Accipiter v. besra*, Besra Sparrow-Hawk (151). 4 *Milvus m. milvus*, Red Kite (131). 5 *Hieraetus pennatus*, Booted Hawk-Eagle (164). 6 *Pernis p. ruficollis*, Crested Honey Buzzard (130). 7 *Buteo r. rufinus*, Longlegged Buzzard (153). 8 *Buteo b. burmanicus*, Buzzard (156). 9 *Buteo hemilasius*, Upland Buzzard (154). 10 *Circus macrourus*, Pale Harrier (190). 11 *Circus a. aeruginosus*, Marsh Harrier (193).

Another race, *sylvatica* (= *carunculatus*) in South America.

GENERAL HABITS. Keeps in family parties of 4 to 10 birds, but flocks of 25 to 30 occasional; more rarely gatherings of even up to a hundred. Flight strong and swift with wing-action reminiscent of geese. A good walker and perches freely on branches of trees during daytime; can cling on with ease to tree-trunk outside nest-hollow with its strong claws. Does not normally dive for food which obtained chiefly by grazing, but can dive very effectively to evade capture when in moult and flightless, or when winged.

FOOD. Largely vegetarian: corms, shoots, and seeds of aquatic and marsh plants, and grains of wild and cultivated rice. Also water insects and their larvae; occasionally frogs and fish.

VOICE. Normally silent except for an occasional low harsh croak. A 'fine loud honk' in the breeding season (Baker).

BREEDING. *Season*, during the SW. monsoon, mainly July to September. *Nest*, normally in a large natural hollow at moderate height in an ancient tree standing in or close to water, sometimes a considerable distance away. Unlined or scantily so with dry leaves, grass, and feathers. Occasionally recorded breeding in old vulture nests, and in holes in old fort walls and earth cliffs. *Eggs*, 7 to 15, pale cream, of the texture and appearance of polished ivory. Average size of 100 eggs 61.8×43.3 mm. (Baker). Incubation by female alone (?); period 30 days.

Up to 47 eggs have been taken from a single nest, the product of two or more females, as is commonly the case where large trees with suitable hollows are scarce.

MUSEUM DIAGNOSIS

Chick (in down). 'Hair brown above with two large buffy yellow spots on the sides, and one on the wing. Face and underparts buffy yellow with a small brown line, often interrupted, through the eyes' — Delacour 1959, 3: 122; 140 (plate).

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♂	339-406	c. 63-70	c. 64-75	139-153 mm.
♀ ♀	c. 280-309	c. 59-66	—	—

Comb of ♂ in breeding season c. 55-60 mm. at widest point.

(Baker)

Weight of a fine adult ♂ 5 lb. 12 oz. (c. 2610 gm.); ♀ 4 lb. 4 oz. to 5 lb. 2 oz. (c. 1925-2325 gm.). — Hume.

COLOURS OF BARE PARTS. Iris dark brown. Bill and comb black. Legs and feet plumbeous.

Genus CAIRINA Fleming

Cairina Fleming, 1822, Philos. Zool. 2: 260. Type, by monotypy, *Anas moschata* Linnaeus

Asarcornis Salvadori, 1895, Cat. Bds. Brit. Mus. 27: 46 (in key), 59. Type, by original designation and monotypy, *Anas scutulata* S. Müller

Close to *Sarkidiornis* in its dark coloration and general proportions of body, wings, bill, legs, and tail. Also in possession of a bony knob on wing. Male appreciably larger than female; bill without comb but becoming considerably swollen at base

of culmen in breeding season. Differs from *Sarkidiornis* mainly in *pattern* of plumage and possession of a conspicuous white wing-patch formed by secondaries and upper wing-coverts.

The genus, which contains the familiar domesticated Muscovy Duck, is represented in India by only a single species.

116. **Whitewinged Wood Duck.** *Cairina scutulata* (S. Müller)

Anas scutulata S. Müller, 1842, Verh. Nat. Ges. Ned. Land-en Volkenk.: 159 (Java)
Baker, FBI No. 2248, Vol. 6: 387

Plate 4, fig. 2, facing p. 64

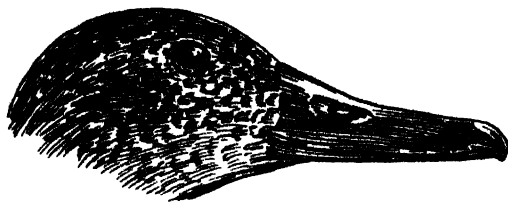
LOCAL NAMES. *Deo häns* (Assam); *Hagrani*, *Daophlantu* (Cachar).

SIZE. Domestic duck +; length c. 81 cm. (32 in.).

FIELD CHARACTERS.

Male (adult). Head and neck white, variably speckled with black as in Nakta. Rest of plumage above and below largely glistening blackish and rich chestnut-brown. A bluish grey speculum bordered anteriorly by a broad black band. A large white patch on wing-shoulder (upper coverts) diagnostic at rest and in flight. This white wing-patch and dark underparts at once distinguish it from Nakta (of about same large size) even at long range.

No eclipse plumage.



× c. ½

Female (adult). Much smaller, otherwise not conspicuously different from male.

Young (immature). Duller and browner.

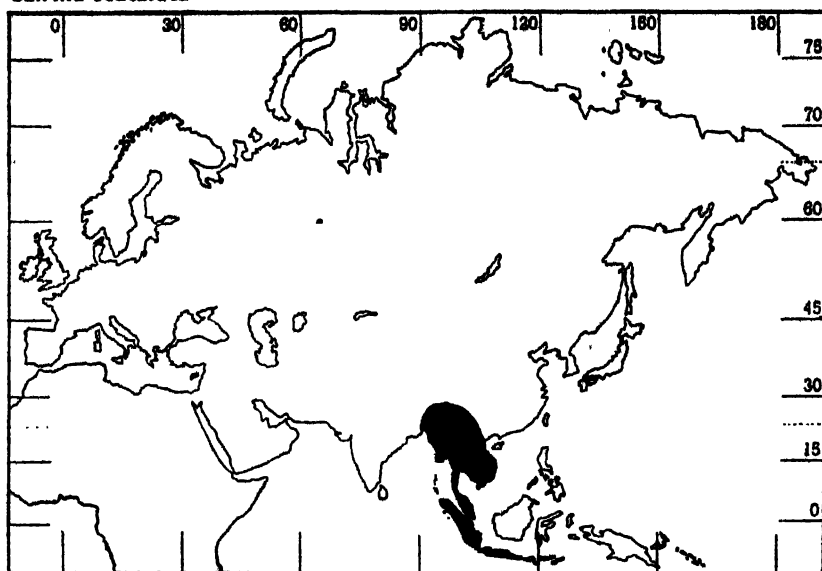
STATUS, DISTRIBUTION and HABITAT. Resident, Assam, particularly the NE. Frontier tracts; Manipur (up to c. 900 m.), and E. Pakistan. Rare and apparently becoming scarcer. Affects waterlogged depressions in evergreen forest, often with gaunt dead trees standing about, and *bheels* amidst dense cane brakes and tall elephant-grass jungle.

Extralimital. Burma, Thailand, Indochina, and through Malaya to Sumatra and Java.

GENERAL HABITS. Keeps in pairs or small parties of 5 or 6 on jungle ponds. Not infrequent in NEFA wherever it occurs, a pair or so present on almost every secluded jungle pool, the more sheltered and overgrown the more likely to hold the duck. Once 11 recorded together; another unusual

recent (1948) observation of two parties totalling about 30 birds on the open Padma river in East Pakistan — February (H. G. Alexander). Habits little known except that like Nakta perches in trees. Flights at dusk to feed in opener waters and marshes during night, returning at dawn to daytime refuge on secluded forest pool.

Cairina scutulata



Residential range

FOOD. Feeding habits in wild state not recorded. The crop of a specimen shot was full of 'pyramidal seeds of a marsh plant' (species?) (T. C. Hutchinson). In captivity apparently omnivorous with a preference for animal food; skimming along the water with head and neck immersed, and diving to chase small fish (Baker).

VOICE. Described as a 'peculiar, distinctive whistle' (R. E. Parsons). The male's as a trumpet-like *cronk-cronk* (B. E. Smythies). Another observer in Burma likens it to a very mournful wail rather than *cronk*, usually heard when the bird is flying at dusk. Female said to whistle on wing. 'When alarmed, uttered a goose-like *honk*' (Hutchinson).

BREEDING. Presumably similar to Nakta. No authentic record in our area. An egg brought to Baker in Cachar by his local collector was reported as taken from a nest of grass and rubbish in a deep natural hollow c. 6 metres up in the bifurcation of a tree-trunk alongside a jungle stream. It matched the eggs of Nakta, and measured 65×48.1 mm.

Delacour (1959) quoting Schuyt gives 'Eggs greenish yellow, 7 to 10, 65×48 mm.; incubation 30 days'.

MUSEUM DIAGNOSIS. For detailed description of plumage etc. see Baker, loc. cit.

Chick (in down). 'Dark brown, the head and neck deeper in colour, the underparts lighter' — Delacour 1959, 3: 140 (plate).

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	363-401	58-66	54-60	127-178 mm.
♀♀	305-356	55-61	—	—
		(Delacour)		(Baker)

Weight. ♂ 6 lb. 8 oz. to 8 lb. 8 oz. (c. 2945-3855 gm.); ♀ 4 lb. 12 oz. to 6 lb. 12 oz. (c. 2150-3050 gm.) — Baker.

COLOURS OF BARE PARTS. Iris ♂ orange-yellow, ♀ brown. Bill orange, mottled with black; in breeding season base becomes swollen in ♂. Legs and feet orange-yellow.

Genus CLANGULA Leach

Clangula Leach, 1819, in Ross, Voy. Disc., App.: xlviii. Type, by monotypy, *Anas glacialis* Linnaeus = *Anas hyemalis* Linnaeus

'Bill shorter than head and than tarsus; high at base. Cutting edge of upper mandible ascending rapidly towards nail, which occupies whole tip of bill. Culmen straight but nail slightly elevated. Nostril close to feathers. Feathering advancing farthest on culmen; on sides of culmen forming a nearly straight oblique line. Rectrices 14, exceptionally 16; tail strongly rounded, rectrices pointed, those of male greatly elongated. Sexes very different, summer and winter also. One species in arctic regions of Northern Hemisphere' (Witherby 1939, 3: 317-18).

117. **Longtail Duck, or Old Squaw.** *Clangula hyemalis* (Linnaeus)

Anas hyemalis Linnaeus, 1758, Syst. Nat., ed. 10, 1:126 (Northern Sweden)

Baker, JBNHS 37:549

Plate 9, fig. 5, facing p. 176

LOCAL NAMES. Unrecorded.

SIZE. Domestic duck —; length body c. 30 cm. (12 in.); pointed tail c. 13 cm. (5 in.).

FIELD CHARACTERS. In winter, when recorded and likely to occur in our area, the contrasty dark chocolate-brown and white plumage pattern of male combined with small head, short bill, and long pointed tail distinctive. The last normally carried horizontal when swimming, partly expanded and erected vertically under excitement.

Male (adult). *Winter*: Head, neck, and upper breast pure white. A dark brown patch on either side of neck behind ear-coverts. Back (i.e. a broad band along spine), pointed central tail, and a collar descending from upper back widening below into a broad pectoral band to include upper abdomen, dark brown. Scapulars, abdomen, flanks, and vent, white.

In flight the scapulars showing up as broad white streaks between dark wings, and the broad brown spinal band (tapering posteriorly into pointed central tail-feathers), aid identification.

Male (adult). *Summer*: Head, neck, and upper breast largely blackish brown. Back same scalloped with chestnut-buff.

Male (in eclipse). 'Mantle darker, the black more pronounced; the sides of the body and flanks have drab and grey feathers mingled with the white' (Baker).

Female (adult). *Winter*: Entire back dark brown, more or less scalloped with fulvous. Head white with dusky crown and patches on sides of upper

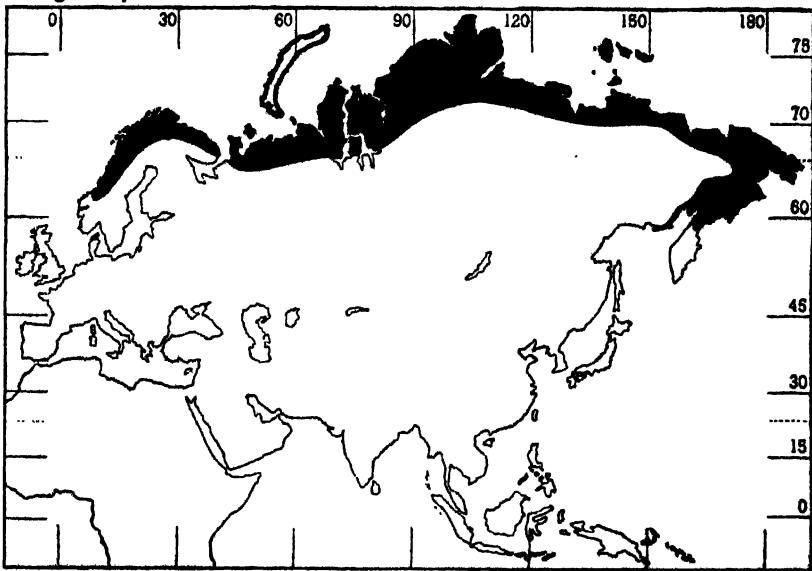
neck. Lower foreneck and upper breast brownish, forming a diffuse pectoral band. Rest of underparts white.

Female (adult). *Summer:* Upperparts darker and duller than in winter, the scalloping less bright and conspicuous.

STATUS, DISTRIBUTION and HABITAT. Rare straggler in winter. Three records from W. Pakistan (Baluchistan, 1933, 1938; Sind, 1936); one each from Kashmir (Hokarsar, 1939) and NE. Assam (Sadiya Frontier Tract, 1935). A half dozen or so together observed on some of these occasions. Shot on Jhelms, and Brahmaputra river.

Extralimital. 'Breeds on arctic coasts of Europe, Asia, and N. America. Winters south to Britain, France, Holland, Black Sea, Caspian Sea, Japan. California, the Great Lakes, N. Carolina; S. Greenland' (Peter Scott).

Clangula hyemalis



■ Breeding range

GENERAL HABITS. Normally a maritime duck, often found far out from the coast even on a choppy sea. A good swimmer and diver, obtaining its food under water, sometimes remaining submerged in the quest for many seconds at a time. Flight reminiscent of Pintail, somewhat less swift.

FOOD. Recorded as mainly animal — molluscs, crustaceans, etc. The Brahmaputra specimen had its crop and gullet crammed with small shrimps.

VOICE. Not recorded in India. A very deep guttural croak, said to be entirely unlike that of any other duck. 'Resembles low or distant bark of dog' (E. M. Nicholson).

BREEDING. *Extralimital.* *Nest* a depression in the ground on open tundras, thickly lined with down; well hidden in undergrowth by lakes and pools. *Eggs*, 6 to 11, olive or yellowish buff, 54 × 38 mm.; incubation 24 days (Delacour).

MUSEUM DIAGNOSES. For details of plumages etc. see Witherby 1939, 3: 321-4; Baker, loc. cit.

Chick (in down). See Delacour 1959, 3: 173 (description), 256 (plate).

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♂	219-236	26-29	32-35	199-246 mm.
♀ ♀	202-210	23-28	—	—

COLOURS OF BARE PARTS. Iris ♂ carmine to hazel, ♀ yellow, immature ♂ brown. Bill ♂ basal half black, terminal portion rose-red to orange-yellow, nail bluish grey; ♀ greyish black; imm. ♂ blue-grey. Legs and feet ♂ light bluish grey, webs dusky, claws black; ♀ greenish grey, webs dusky; imm. ♂ pale grey, webs nearly black (Witherby).

Genus BUCEPHALA Baird

Bucephala Baird, 1858, Rep. Expl. and Surv. R. R. Pac. 9: L, 788, 795. Type, by original designation, *Anas albeola* Linnaeus

Bill short, higher than broad at base, not much flattened at tip, tapering slightly throughout, more rapidly and rounded at end. Profile of culmen very slightly concave. Nostril placed nearer to tip than to base of bill, a feature peculiar to this duck. Lamellae short, stout, and placed very close together. Tarsus short; scutellate in front. Hind toe well developed, with broad lobe. Legs placed far back rendering walking difficult. Wings pointed. Tail long and strongly graduated. Posterior end of sternum prolonged as in *Merganser*. Sexes dimorphic.

Only one species occurs in India as a rare winter visitor.

118. Goldeneye Duck. *Bucephala clangula clangula* (Linnaeus)

Anas Clangula Linnaeus, 1758, Syst. Nat., ed. 10, 1: 125 (Sweden)

Baker, FBI No. 2284, Vol. 6: 460 (= *Glaucionetta c. clangula*)

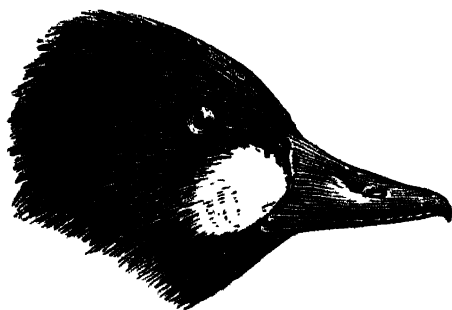
Plate 9, fig. 6, facing p. 176

LOCAL NAMES. None recorded.

SIZE. Domestic duck —; length c. 46 cm. (18 in.).

FIELD CHARACTERS.

Male (breeding). Head, nape, chin, and throat black, the first two brilliantly glossed with metallic green. A distinctive white oval cheek-patch at base of bill. Back and tail black, with bold white streaks on scapulars and flanks. Wings black with a conspicuous broad white patch along basal half when closed. Neck, breast, and underparts white.



x c. 1

At rest black and white plumage, and triangular mop-shaped head with white cheek-patch, peculiar. In flight, black head, white cheek-patch, short-looking white neck, black back between streaked white scapulars, and white patch on wings next to

body (secondaries and coverts) are leading clues.

Male (in eclipse). Like female, but always retaining full wing colour with pure white speculum.

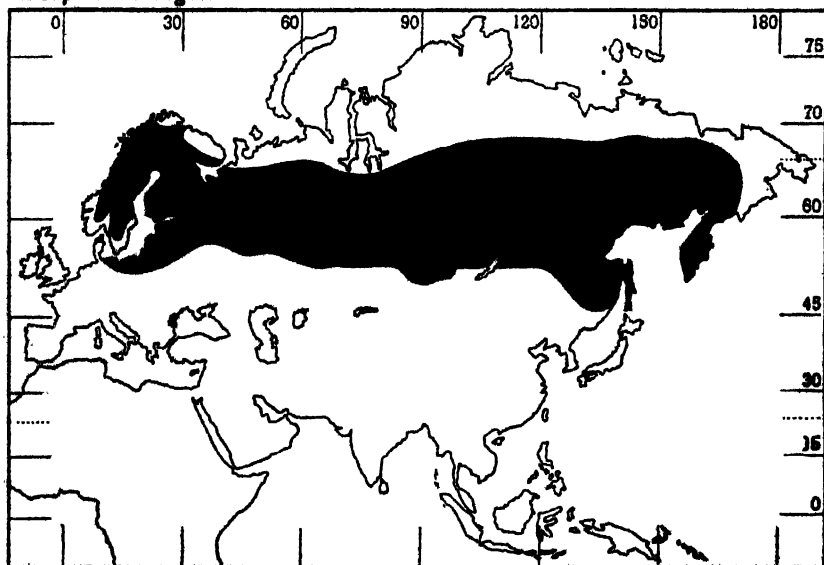
Female (adult). Head and neck hair-brown, with a dull white collar round base. Upperparts mottled blackish and grey with a white wing-patch (secondaries and coverts, in part). A grey band on upper breast (below white collar), greyish flanks and vent. Rest of underparts white.

Young (immature). Male like adult female, somewhat larger and darker. Female similar but with less white on wing. Male assumes adult plumage in second year.

STATUS, DISTRIBUTION and HABITAT. Uncommon winter visitor mainly to W. Pakistan, N. India and Assam. Recorded from Sind (?), Punjab (Attock, on the Indus), U.P. (Lucknow dist.), Bihar (Champaran dist.), Assam (Lakhimpur dist.), Manipur. On open reaches of swift-flowing rivers where these debouch from the hills, and on *bheels*.

Extralimital. 'Breeds from northern Scandinavia east across Europe and Asia, north to the limit of trees, south to Germany, Balkans, central Russia and Siberia to Kamchatka and Sakhalin. Winters from British Isles, Mediterranean, to southern China and Japan' (Peter Scott).

Bucephala clangula



■ Breeding range

GENERAL HABITS. A diving duck like the pochards, partial outside the breeding season to the sea coast. Inland it prefers fairly deep clear open water to vegetation-covered jheels. Has been met with in winter in small parties of 5 or 6. A good swimmer and diver; awkward on land. Flight swift and erratic, with rapid strokes of the short, pointed wings which produce a peculiar whistling sound.

FOOD. Mainly animal matter — molluscs, crustaceans, aquatic insects, etc.

VOICE. Unrecorded in India. Elsewhere, female said to emit a loud hoarse note occasionally; male a penetrating *speer, speer*, and in the spring 'a rasping, vibrating double note *quee-reek*' (Delacour).

BREEDING. Extralimital. *Nest*, a natural hollow in tree-trunks etc., lined with down. Nest-boxes put up for it in likely places are frequently occupied. *Eggs*, 6 to 15, bluish green. Average size of 200 eggs 55.2 × 42.5 mm. (Baker).

MUSEUM DIAGNOSIS. For details of plumages, structure, etc. see Witherby 1939, 3: 311-14.

Chick (in down). See Delacour 1959, 3: 178 (description); 256 (plate).

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	207-227	31-36	34-38	77-90 mm.
♀♀	197-210	28-31	—	—

(Witherby)

Weight. ♂ 1 lb. 12 oz. to 2 lb. 8 oz. (c. 795-1135 gm.); ♀ 1 lb. 8 oz. to 2 lb. (c. 680-910 gm.) — Baker.

COLOURS OF BARE PARTS. ♂ Iris golden yellow. Bill black. Legs and feet yellow or orange with blackish webs. ♀ Iris pale yellow or pale blue-green. Bill black, with a yellow patch next to nail. Legs and feet brownish yellow.

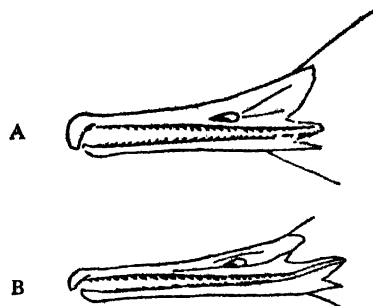
Genus *Mergus* Linnaeus

Mergus Linnaeus, 1758, Syst. Nat., ed. 10, 1: 129. Type, by subsequent designation, *Mergus castor* Linnaeus = *Mergus serrator* Linnaeus

Sexes dimorphic; both with a nuchal crest. Bill long, narrow, tapering throughout with culmen nearly straight, the nail strongly hooked. Serrations or 'teeth' coarse, with tips pointing backwards saw-like. Nostril large, oblong, placed between $\frac{1}{2}$ and $\frac{1}{3}$ length of bill from base. Tarsi very short, placed far back on the body. Feet large with well-lobed hallux. Tail fairly long, rounded, of 16 to 18 stiff cuneate feathers.

Key to the Species

		Page
A	Bill shorter than head.....	<i>M. albellus</i> 201
B	Bill longer than head.....	1
1	Head and neck black glossed with green.....	a
	Head and neck rufous.....	b
a	Lower parts white throughout.....	
 <i>M. merganser</i> (adult ♂)	203, 204
	Upper breast rufous marked with black.....	
 <i>M. serrator</i> (adult ♂)	206
b	Chin white, back grey.....	
 <i>M. merganser</i> (adult ♀ and young ♂)	203, 204
	Chin streaked with rufous, back brown.....	
 <i>M. serrator</i> (adult ♀ and young ♂)	206



Bills of *M. merganser* (A) and *M. serrator* (B) to show differences in shape, position of nostrils and feathering ($\times c. \frac{1}{2}$)

119. **Smew.** *Mergus albellus* Linnaeus

Mergus Albellus Linnaeus, 1758, Syst. Nat., ed. 10, 1: 129

(Mediterranean Sea near Smyrna)

Baker, FBI No. 2286, Vol. 6: 466

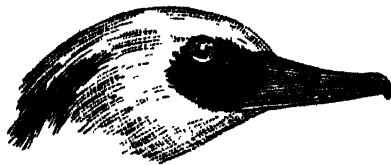
Plate 9, fig. 7, facing p. 176

LOCAL NAMES. *Nikenne* (Hindi); *Jhāli* (Sind).

SIZE. Domestic duck —; length *c.* 46 cm. (18 in.).

FIELD CHARACTERS.

Male (breeding). Predominantly white, with a large metallic black patch on face, a black band from behind eye to nape, and drooping nuchal crest. Back black with two black streaks diverging from its anterior end down each side of white breast. Sides of body, and tail, grey. In flight an easily recognized pied duck, mainly white, with a broad black spinal band, dark tail, and conspicuous black-and-white wings.



$\times c. \frac{1}{2}$

Female (adult). Forehead, crown, nape, and short peak-like nuchal crest chestnut-red. Throat and sides of head contrasty white. Back greyish brown. Breast and flanks grey. Rest of underparts white. In flight the contrasty chestnut and white head, greyish body and black-and-white wings distinctive.

Male (in eclipse). Like female, but larger with some black on mantle and larger white patch on secondaries.

Young (immature). Like female but paler, more uniform generally and with the white wing-coverts tipped with ashy brown.

STATUS, DISTRIBUTION and HABITAT. Uncommon and sparse but regular winter visitor to W. Pakistan and northern India. Recorded from Baluchistan, Sind, NWFP, NW. Punjab, Delhi, Bhutan duars, NE. Assam; south from N. Gujarat, Bihar (Hazaribagh), Orissa (Cuttack), W. Bengal

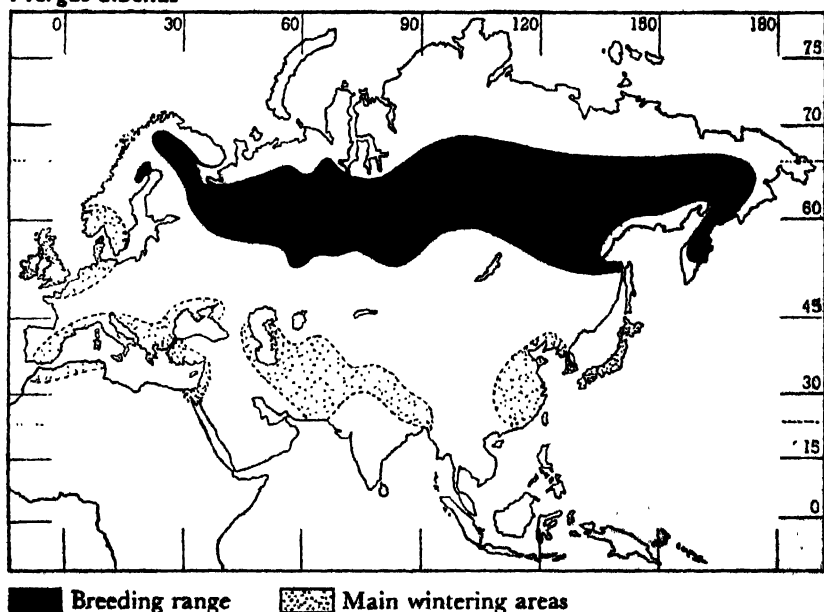
(Raniganj). Affects small open jheels, but chiefly clear Himalayan streams where these debouch from the foothills into the plains.

Extralimital. 'Breeds in Europe and Asia from Scandinavia to Siberia and south to the Volga, Turkestan and the Amur. Winters on coasts and lakes from Britain, the Mediterranean, Persia, to China and Japan' (Peter Scott).

GENERAL HABITS. Keeps in small parties; occasionally large flocks. A fast swimmer and proficient diver. Normally rides high on the water but, like the pochards, will lower itself considerably on alarm. Flies swiftly with rapid though noiseless beats of the pointed wings.

FOOD. Mainly fish. Crustaceans, molluscs, aquatic insects and their larvae, worms, etc. also taken; occasionally some vegetable matter.

Mergus albellus



VOICE. Unrecorded in India.

BREEDING. Extralimital. Col. A. E. Ward's record of breeding in Ladakh has not been confirmed, and is doubtful. *Nest*, in natural hollows in tree-trunks near water; sometimes in nest-boxes in Finland. *Eggs*, 6 to 10, pale creamy buff. Average size of 137 eggs 52.2×37.5 mm. (Baker).

MUSEUM DIAGNOSIS. For detailed description of plumages and structure see Witherby 1939, 3: 377-9.

Chick (in down.) See Delacour 1959, 3: 193 (description), 256 (plate).

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	192-205	28-30	30-32	71-76 mm.
♀♀	178-186	25-28	—	—
				(Witherby)

Weight ♂ 1 lb. 4 oz. to 1 lb. 12 oz. (c. 565–795 gm.); ♀ 1 lb. to 1 lb. 8 oz. (c. 450–675 gm.) — Baker.

COLOURS OF BARE PARTS. Iris ♂ bright red (pearl grey in very old birds — Baker); ♀ reddish brown. Bill ♂ plumbeous, nail greyish white; ♀ dark lead-grey tinged greenish laterally, nail whitish. Legs and feet ♂ plumbeous; ♀ paler and tinged with green, webs black (Witherby).

MERGUS MERGANSER Linnaeus

Key to the Subspecies

Wing: ♂ 283–295 mm.; ♀ 250–267 mm. *M. m. merganser*

Wing: ♂ 243–284 mm.; ♀ 189–257 mm. *M. m. orientalis*

120. **Goosander or Common Merganser.** *Mergus merganser merganser* Linnaeus

Mergus Merganser Linnaeus, 1758, Syst. Nat., ed. 10, 1: 129 (Sweden)

Baker, FBI No. 2287, Vol. 6: 469

LOCAL NAMES. Unrecorded.

SIZE. Domestic duck +; slimmer. Length c. 66 cm. (26 in.).

FIELD CHARACTERS.

Male (breeding). Head, crest, and upper neck black glossed with metallic green and purple. Mantle (scapulars) glossy black; lower back, rump, and upper tail-coverts grey vermiculated with white. Tail silvery brown. Primaries black; secondaries and coverts white or partly white. Extreme upper back, lower neck, and underparts white, faintly tinged with salmon-pink.



Bill from above $\times c. \frac{1}{4}$

In flight general aspect black and white with slender head and neck, narrow pointed

red bill, and red legs.

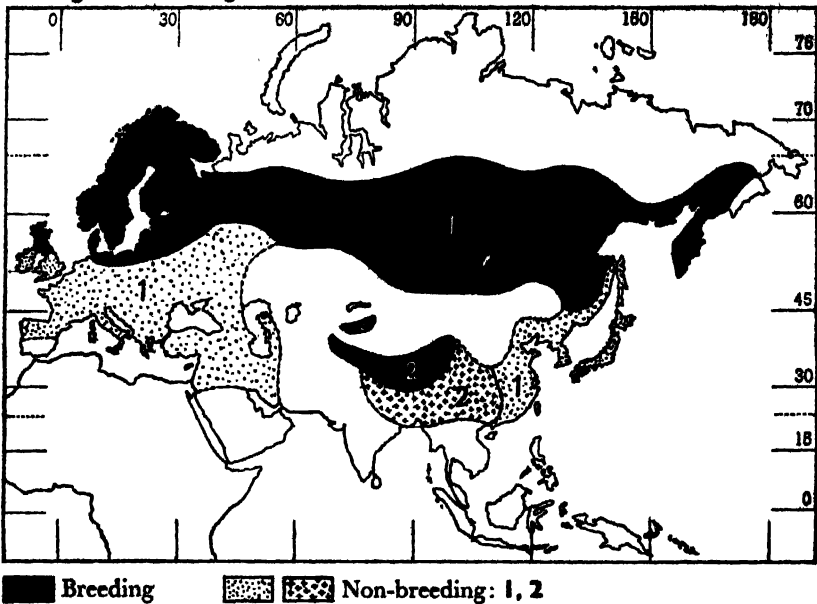
Female (adult). Head, crest, and neck dark chestnut and cinnamon-brown; chin and upper throat white. Upperparts mottled bluish grey-brown. Primaries blackish; secondaries white and grey, forming a conspicuous white speculum. Tail grey-brown. Underparts white, striped with grey on flanks.

In flight rufous head, grey back, white underparts, black-and-white wings, thin neck, pointed red bill, and red legs distinctive.

Male (in eclipse). Resembles female, but retains white wing-coverts.

Young (immature). Male like adult female but upperparts browner, head paler, chin and throat less white.

Chick (in down). See Delacour 1959, 3: 217 (description), 256 (plate).

1 *Mergus m. merganser* 2 *M. m. orientalis*

121. **Eastern Merganser.** *Mergus merganser orientalis* Gould

Mergus Orientalis Gould, 1845, Proc. Zool. Soc. London: 1 (Amoy, China)

Baker, FBI No. 2288, Vol. 6: 472

Vol. 2, Plate 20

LOCAL NAME. None recorded.

SIZE. Slightly smaller than 120. Length c. 63 cm. (25 in.).

FIELD CHARACTERS.

Male (breeding). Differs from western (nominate) race in somewhat smaller size and greater extent of black on mantle. Grey of lower back and rump paler and more freckled with white; salmon-pink tinge on underparts more pronounced.

Female, male in eclipse, and immature male differ from adult as in the western form (q.v.).

STATUS, DISTRIBUTION and HABITAT. Chiefly winter visitor. Rare in NW. India; Nepal; fairly common in the E. Himalayan foothills. Status of the two races within our limits uncertain. Specimens of nominate race taken in winter in West Pakistan (Sind, Makran coast), U.P., Maharashtra (Bombay), M.P. (Raipur district, ssp.?), and NE. Assam (Lohit river). *M. m. orientalis* partly resident in Ladakh (and possibly in N. Sikkim), but specimens collected in Ladakh in May/June approximate in coloration and wing measurement to nominate race (Meinertzhagen, *Ibis*, 1927: 616).

Sight records racially indeterminate. Affects large rivers and lakes; also fast-flowing streams, especially where these debouch from the northern hills into the plains.

Extralimital. *M. m. merganser* breeds in Europe and Asia from Iceland, British Isles, Switzerland, the Balkans, to Kamchatka, the Kurile and Commander Islands. South in winter to Mediterranean and China.

M. m. orientalis breeds principally in Afghanistan, Turkestan, Altai, Tibet. Winters N. India, N. Burma and China (Szechuan) and farther east, where it occurs with the nominate race (Peter Scott).

GENERAL HABITS. An expert swimmer and diver, perfectly at home on icy torrential E. Himalayan streams. Apparently uncomfortable on land. When disturbed resting on bank, shuffles into water on its breast. Keeps in pairs or small parties of 5 to 8 — often the sexes separate — which coalesce into larger mixed flocks of 40–50, or more, while coursing up and down to hunt in favourite reaches of clear rapid streams. Characteristically follows their bends, seldom deviating or altering course even at sight of a gunner. Usually flies low almost clipping the wavelets, effectively camouflaged against the shimmering background of wet stones and cascading water. Often hunts by cooperative effort like cormorants, a flock swimming in a semicircle from bank to bank across a rapid rippling stream, herding small fish into the less turbulent shallows near the banks — dashing and splashing in the white water in pursuit and diving energetically after the quarry. Little Egrets (*Egretta garzetta*) commonly take advantage of this habit by attending on the hunting flocks, leap-frogging over the duck, back and forth, to take up advance positions on the banks, and seizing any fish stranded in the marginal shallows in their rush to escape. When cruising in calm water, the males especially have a curious habit of arching their necks, and then darting their bills vertically upwards. This is not in an effort to swallow some large morsel, but evidently a kind of display (R. E. Parsons).

FOOD. Almost exclusively fish (up to 125 or 150 mm. long), for seizing which the serrated bill is specially adapted. In Britain 49 perch averaging 3 inches (75 mm.), and a young pike, have been taken from a single stomach (Witherby). Occasionally also some crustaceans, aquatic insects, etc. along with a quantity of pebbles.

VOICE. Only an occasional croak or *krrr* recorded in India.

BREEDING. Within our limits *M. m. orientalis* (?) breeds in Ladakh (possibly also in northern Sikkim and Bhutan) at elevations between c. 3000 and 4000 metres, and perhaps higher, e.g. on Tso Moriri and Pangong lakes, and Indus and Tankse rivers (B. B. Osmaston, R. Meinertzhagen). *Season.* No nests with eggs found, but downy ducklings reported on various lakes in June. *Nest,* (in Tibet) in hollows and crevices in crumbling rock cliffs, lined with rubbish, and thickly with down. *Eggs,* 6 to 10 (?) like those of *Goosander* but darker and smaller — pale buff or stone-buff, close and fine textured, fairly glossy. Average size of 20 eggs 64.6 × 44.8 mm. (Baker). Incubation period ?. In *M. m. merganser* full clutch of 7 to 16 eggs; incubation period 28–32 days (Delacour).

MUSEUM DIAGNOSIS. For description of plumages, structure, etc. of nominate race see Witherby 1939, 3: 364–7.

MEASUREMENTS

		Wing	Bill (from feathers)	Tarsus	Tail
<i>M. m. merganser</i>	♂ ♂	283-295	55-61	46-50	104-115 mm.
	♀ ♀	250-267	45-51	—	—
				(Witherby)	
<i>M. m. orientalis</i>	♂ ♂	243-284	49-54	—	—
	♀ ♀	189-257	40-47	—	—
				(Baker)	

Wing ♂ 275-285; ♀ 244-275 (Delacour).

Weight ♂ 2 lb. 12 oz. to 3 lb. 5 oz. (c. 1250-1500 gm.); ♀ 2 lb. to 2 lb. 10 oz. (c. 910-1195 gm.) — Hume.

COLOURS OF BARE PARTS. Iris ♂ carmine or deep red, sometimes tinged with brown in younger birds; ♀ brown. Bill vermilion; culmen sometimes rather dusky in non-breeding season; nail black. Legs and feet bright vermilion. Colours in ♀ duller.

122. Redbreasted Merganser. *Mergus serrator serrator* Linnaeus

Mergus Serrator Linnaeus, 1758, Syst. Nat., ed. 10, 1: 129 (Sweden)

Baker, FBI No. 2289, Vol. 6: 473

Plate 9, fig. 8, facing p. 176

LOCAL NAMES. None recorded.

SIZE. Domestic duck —; slimmer. Length c. 58 cm. (23 in.).

FIELD CHARACTERS. Smaller and slimmer than Goosander, with a prominent straggly, backwardly-directed double crest (with an upper and lower portion) sticking out stiffly from hindcrown.

Male (breeding). Differs from male Goosander (with entire underparts white) in having a dark band (blotchy chestnut and black) on upper breast; rest of underparts white. This comparative feature particularly helpful in identification at distance and in flight. Head, crest, throat and upper neck glossy blackish green. A broad white collar below this, interrupted on hindneck by a black longitudinal stripe continuing from nape into black upper back. Black of back broader, with bold white spots in a chequer pattern at its anterior end covering wing-shoulder. A broad white lateral band along closed wing (secondaries and coverts). Lower back, rump, upper tail-coverts, and upper flanks pale grey vermiculated with black.

Male (in eclipse). Like female, but with the mantle darker; wings more or less as in breeding male.

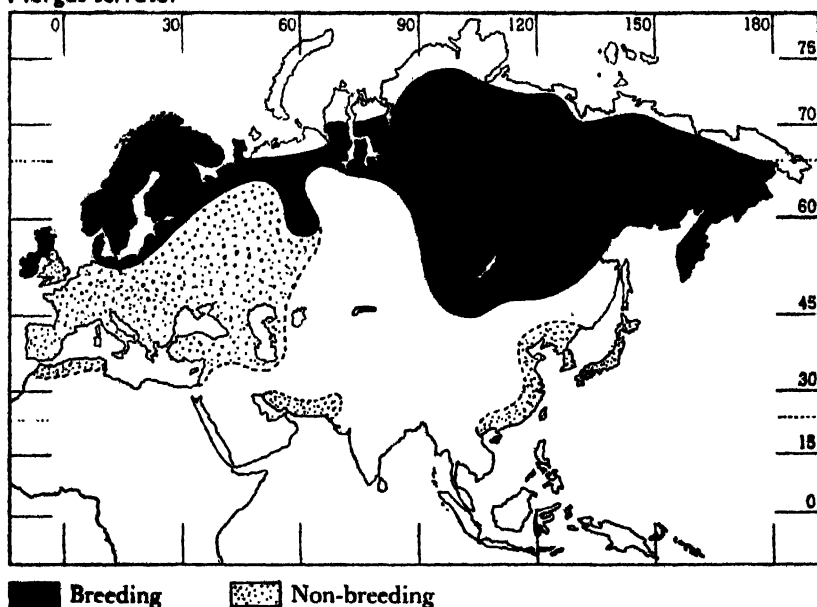
Female (adult). Rather like female Goosander. Crown, crest (shorter than male's), nape, and hindneck brown; sides of head and neck cinnamon. Chin, throat, and foreneck duller, rufous-washed white. Upperparts dark greyish brown, scalloped paler. Wings as in male but with less white. Underparts white, the breast and sides mottled with ashy brown.

Young (immature) male like adult female, but overall more brown less grey. Crest shorter; bare parts duller coloured.

STATUS, DISTRIBUTION and HABITAT. Vagrant in winter. Only six authentic occurrences within our limits: four in W. Pakistan [Charbar, Makran

coast, November 1875; Sind (Karachi harbour); Baluchistan, Quetta dist. (Khushdil Khan lake 1902, Pishin 1908)] and two in W. Bengal: an example procured in Calcutta market, presumably from that neighbourhood (December 1889), and another more recently (January 1961) in the 24-Parganas district (Biswas, *in epist.*). According to C. B. Ticehurst (JBNHS 32: 95) a not uncommon winter visitor to the Makran coast; recorded from Ormara, Charbar and Jask (December/January).

Mergus serrator



Extralimital. 'Breeds in suitable places throughout northern Europe, Asia, N. America (including British Isles). South in winter to the Mediterranean, Persian Gulf, China, Formosa, Gulf of Mexico, and Florida' (Peter Scott).

GENERAL HABITS. Not markedly different from those of the Goosander (q.v.).

BREEDING. Extralimital. Unlike Goosander does not usually nest in tree hollows. *Nest*, large, compact, of moss, grass, etc. lined with down. In dense cover of bushes, or in holes in banks and cliffs. '*Eggs*, 7 to 12 greyish to greenish buff, 65 × 45 mm.; incubation 26–28 days' (Delacour).

MUSEUM DIAGNOSIS. Bill proportionately longer and narrower than in Goosander, less hooked at tip, and with more teeth or lamellae. See figures, p. 201.

Chick (in down). See Delacour 1959, 3: 210 (description), 256 (plate).

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	244–252	53–62	40–45	79–88 mm.
♀♀	217–231	48–55	—	—

Two adult ♂♂ obtained in India have wings of c. 253 and 254 mm.

Weight ♂ 1 lb. 12 oz. to 2 lb. 4 oz. (c. 790–1025 gm.); ♀ under 2 lb. (910 gm.); possibly goes somewhat higher — (Baker).

COLOURS OF BARE PARTS. Iris ♂ carmine or red-brown; ♀ brown or red-brown, sometimes carmine. Bill ♂ orange-red to deep vermillion, the edge of culmen and nail black; ♀ duller, more orange-red with the culmen dusky over a greater area. Legs and feet orange-red to deep vermillion, the joints and webs duskier. Duller in ♀.

Genus *OXYURA* Bonaparte

Oxyura Bonaparte, 1828, Ann. Lyc. Nat. Hist. New York 2: 390. Type, by monotypy, *Anas rubidus* Wilson

Erismatura Bonaparte, 1832, Giorn. Acad. Sci. Lett. Arti, Roma, 53(54): 208, new name for *Oxyura* Bonaparte

Bill large, very swollen at base; nail small and curved inwards. Culmen concave; anterior part of bill flat and broad, the lamellae coarse and set far apart. Nostrils large, oval, placed nearer to base than to tip of bill. Tarsi short, placed far back as in Diving Ducks; feet very large; middle toe almost twice length of tarsus; hind toe broadly lobed. Wings short and pointed. Tail well graduated, of very narrow, stiff feathers, longer than tarsus; tail-coverts short and scanty. Sexes slightly dimorphic.

123. **Whiteheaded Stiff-tailed Duck.** *Oxyura leucocephala* (Scopoli)

Anas leucocephala Scopoli, 1769, Annus I Hist. Nat.: 65

(probably from northern Italy)

Baker, FBI No. 2285, Vol. 6: 463

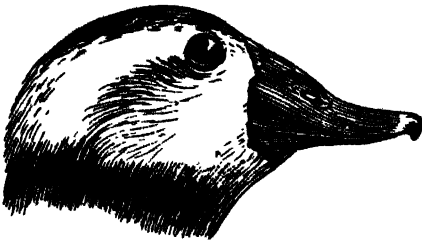
Plate 9, fig. 9, facing p. 176

LOCAL NAMES. None recorded.

SIZE. Domestic duck —; length c. 46 cm. (c. 18 in.).

FIELD CHARACTERS. A little larger than Common Teal, but squat and tubby, with very peculiar bill and tail. Bill very high and swollen at base, sinking abruptly and broadening towards tip. Tail of stiff, narrow, pointed feathers with very short coverts at its base, looking like a bunch of wires artificially stuck in; often carried comically upright when swimming.

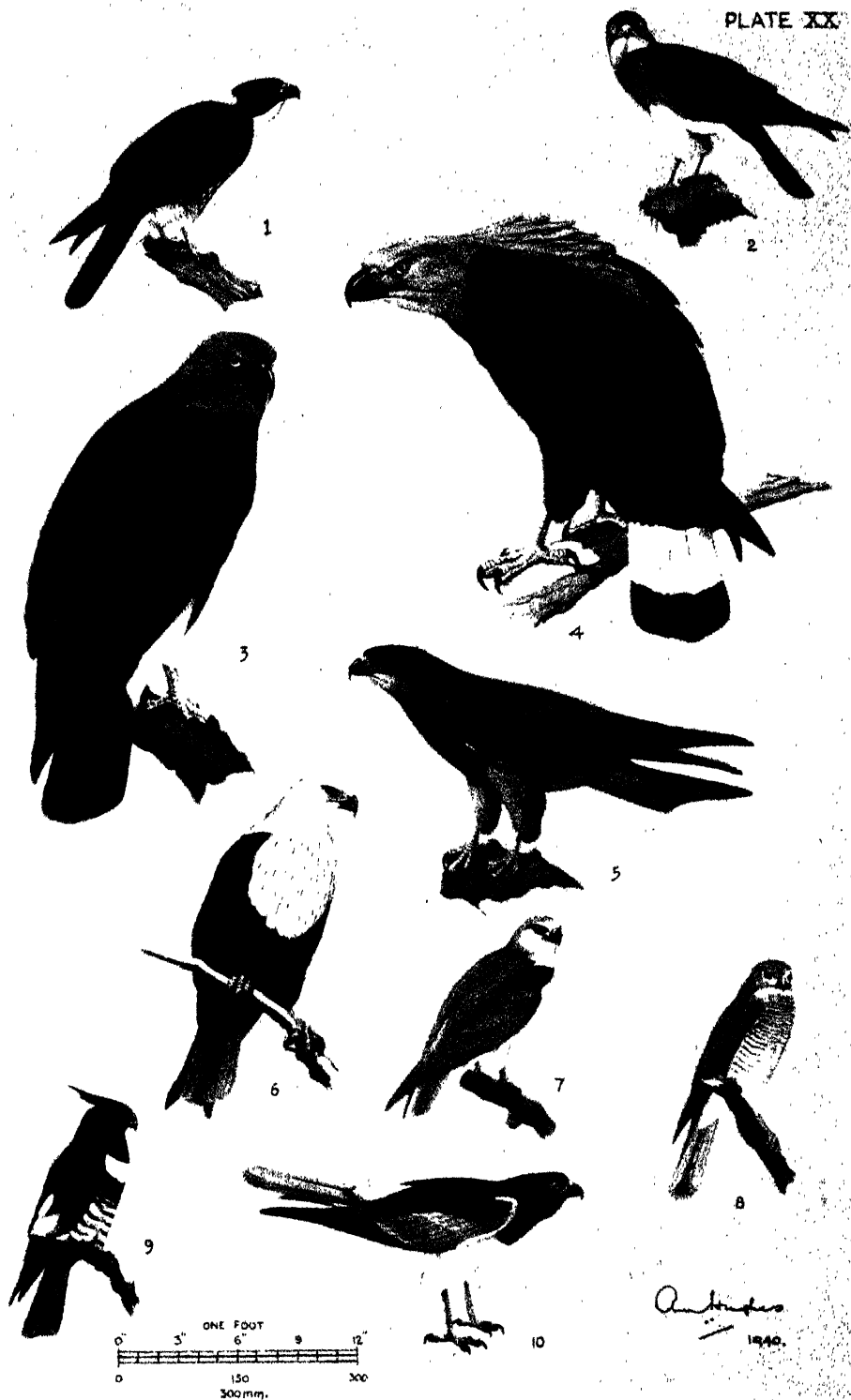
Male (breeding). Head white, with a black patch on crown, and slaty blue to sky-blue bill. Neck blackish, fading into chestnut on



× c. 1

PLATE 11

1 *Butastur teesa*, White-eyed Buzzard-Eagle (157). 2 *Butastur liventer*, Rufous-winged Buzzard-Eagle (SE). 3 *Ichthyophaga n. plumbea*, Himalayan Grey-headed Fishing Eagle (177). 4 *Haliaeetus leucorhynchus*, Pallas's Fishing Eagle (174). 5 *Milvus m. govinda*, Pariah Kite (133). 6 *Haliastur i. indus*, Brahminy Kite (135). 7 *Elanus c. vociferus*, Black-winged Kite (124). 8 *Accipiter b. poliopsis*, Shikra (140). 9 *Aviceda l. leuphotes*, Indian Black-crested Baza (127). 10 *Circus melanoleucos*, Pied Harrier (192), ♂.



upper breast and sides, and to rusty grey on back and mantle. Lower back and rump pencilled with black. Upper tail-coverts chestnut, finely pencilled with black. Underparts silvery white mottled with grey. Wings grey.

Female (adult) and male in eclipse have the head and neck brown with blackish bars; the crown darker. A conspicuous whitish line below eye from bill to nape. Throat and sides of upper neck whitish; rest of plumage as in breeding male, somewhat greyer and paler, with finer barring.

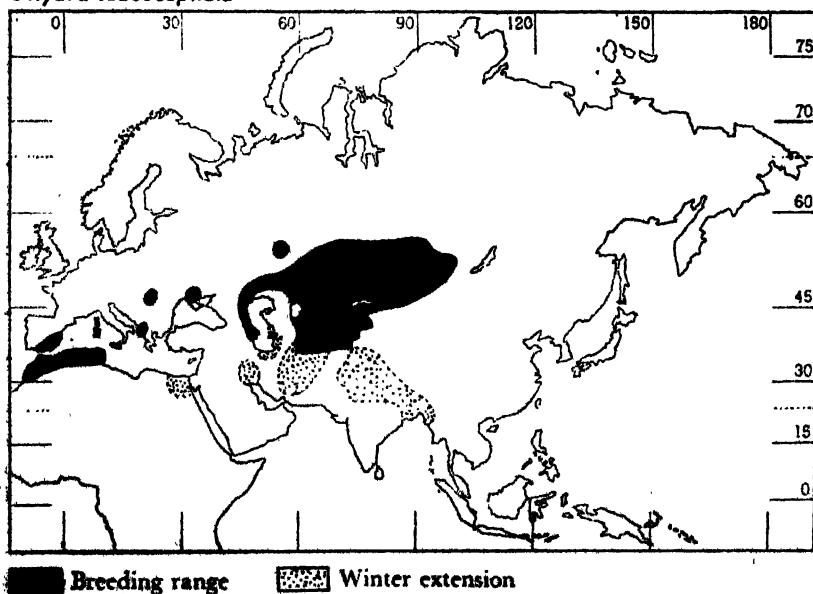
Young (immature). Like adult female; male redder on back.

STATUS, DISTRIBUTION and HABITAT. Casual and sparse winter visitor mainly to the northwestern portions of our area. Sporadically but not infrequently recorded (specimens and observation) from W. Pakistan (Peshawar, Nowshera, Shahpur, Kohat districts), Punjab (Gujrat and Mianwali dists.), Baluchistan (Langi-nawar, Nushki and Quetta dists.), Sind (Larkana and Sukkur dists.), Bahawalpur. In recent years found in large numbers on certain lakes on the Punjab Salt Range — Khabakki, Kallar Kahar, Nammal. Maximum number counted 723 (February 1965) on Khabakki (C. D. W. Savage). Also N. India — E. Punjab (Ludhiana dist.), Kashmir, Delhi dist., Uttar Pradesh (Pilibhit and Hardwar dists.). Not farther east or south except reportedly twice in Calcutta market (Finn). On large freshwater lakes and brackish lagoons with underwater vegetation.

Extralimital. Breeds in the Mediterranean, Black and Caspian Sea areas, and Turkestan. Winters south to Egypt, Palestine and Iraq.

GENERAL HABITS. In many ways reminiscent of the grebes. Keeps in parties of a half dozen or so, and flocks of 20 to 30. Very local, usually affecting particular portions of a lake either by itself or in association with grebes; rarely with other ducks. Normally rides very low on the water, like

Oxyura leucocephala



a cormorant, showing only head, a small portion of rump, and the stiff, pointed tail cocked vertically when at rest; lowered into water when swimming. Flight laboured and grebe-like, preceded by much skittering on the surface to take off. But is an expert swimmer and diver, seeking safety in the water in preference to flying away even when closely approached. Partially submerges itself to escape observation, swimming away from the intruder with only the head and part of rounded back showing, and body and tail out of sight, thus looking like a dabchick in the distance. Dives by quietly lowering itself and vanishing below, or by rolling over smoothly like a porpoise, head in first, the whole back, tail, and legs turned over in succession. The tail is bent downwards, with the legs showing below, these parts being the last to go under.

FOOD. Mainly vegetable matter: corms, seeds, and leaves of aquatic plants; also insect larvae, molluscs, and crustaceans. The stomach of an Indian-killed example contained vegetable matter exclusively (W. A. Whitehead, JBNHS 35: 212).

VOICE and CALLS. None recorded in winter.

BREEDING. Extralimital. *Nest*, a floating pad of reeds and rushes overlaid with down; anchored and concealed among reeds and sedges. *Eggs*, 6 to 13, white, about 66×50 mm.; incubation period unrecorded (Delacour).

MUSEUM DIAGNOSIS

Chick (in down). See Delacour 1959, 3: 242 (description), 256 (plate).

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	155-165	46-48	34-37	110-112 mm.
♀♀	150-155	43-45	—	—
				(Delacour)

22 specimens from the Punjab Salt Range give

	Wing	Bill (from feathers)	Tarsus
8 ♂♂	164-172	46-47	43-46 mm.
14 ♀♀	150-167	43-46	41-45 mm.

(C. D. W. Savage)

COLOURS OF BARE PARTS. Iris dark brown. Bill ♂ generally slaty blue turning to pale sky- or ultramarine blue just before emigration in February-March (C. D. W. Savage); ♀ and imm. duller. Legs and feet plumbeous-black, the webs and toes black.

Order FALCONIFORMES

Family ACCIPITRIDAE. Hawks, Vultures, etc.

Bill short with upper mandible longer than lower, curved and strongly hooked at tip: basal portion covered with a cere, usually bright coloured, in which the nostrils are situated. Feet strong, furnished with powerful hooked claws. Hallux always present. Sexes more or less alike; female usually larger.

For further details of structure and morphology see Stresemann 1927-34, *Aves*: 811-16; Baker 1928, *FBI* 5: 1-2; Witherby 1939, 3: 1.

Key to the Genera

	Page
A Head and neck bare.....	1
B Head and neck feathered.....	2
1 Bill slender.....	a
Bill stout.....	b
a Nostrils elongate and horizontal.....	<i>Neophron</i> 310
b Nostrils a narrow vertical slit.....	<i>Gyps</i> 301
Nostrils round or oval.....	I
I No wattle on neck.....	<i>Aegyptius</i> 298
Fleshy wattle on either side of neck.....	<i>Torgos</i> 296
2 Bill lengthened and vulturine in shape; claws blunt; a tuft of long bristles on the chin.....	<i>Gypaetus</i> 314
Bill short and aquiline in shape; claws sharp and generally greatly curved; no tuft on chin.....	c
c Tarsus completely feathered in front and behind.....	II
Tarsus naked or partially feathered.....	III
II Claws but little curved, inner longer than hind.....	<i>Ictinaetus</i> 283
Claws much curved, hind claw longer than inner.....	a ¹
a ¹ Primaries exceeding secondaries by less than length of tarsus	<i>Spizaetus</i> 258
Primaries exceeding secondaries by more than length of tarsus.....	b ¹
b ¹ Occipital crest much developed.....	<i>Lophotriorchis</i> 270
Occipital crest lacking or rudimentary.....	c ¹
c ¹ Inner toe (without claw) longer than culmen (without cere).....	<i>Hieraetus</i> 265
Inner toe (without claw) about same length as or shorter than culmen (without cere).....	<i>Aquila</i> 272
III Both sides of upper mandible with two sharply pointed conical 'teeth'.....	<i>Aviceda</i> 214
Upper mandible without 'teeth'.....	a ²
a ² Lores feathered.....	<i>Pernis</i> 221
Lores unfeathered.....	b ²
b ² Tarsus long, two or more times length of bill from tip to gape.....	c ²
Tarsus short, less than two times length of bill from tip to gape.....	c ²
c ² Feathers across throat and up each side of neck forming conspicuous ruff.....	<i>Circus</i> 316
Ruff not present.....	d
d Nuchal crest absent or pointed.....	<i>Accipiter</i> 232
Nuchal crest broad covering whole nape.....	<i>Spilornis</i> 329
c ² Front of tarsus covered with large overlapping hexagonal scales.....	<i>Buteo</i> 256
Front of tarsus covered with vermiculations or small hexagonal scales.....	d ¹
Front of tarsus scutellate.....	d ²
d ¹ Size small (length c. 33 cm. = 13 in.); second primary longest.....	<i>Elanus</i> 212
Size larger (length c. 56-68 cm. = 22-27 in.); third	

	Page
or fourth primary longest.....e	
e Claws grooved beneath..... <i>Circus</i>	326
Claws not grooved beneath..... <i>Pandion</i>	335
d ⁹ Tail forked..... <i>Milvus</i>	224
Tail not forked.....e ¹	
e ¹ Tarsus scutellated behind.....f	
Tarsus with large reticulations or hexagonal scales behind.....f ¹	
f Primaries deeply notched..... <i>Buteo</i>	251
Primaries not deeply notched..... <i>Ichthyophaga</i>	292
f ¹ Third primary longest..... <i>Haliaeetus</i>	285
Fourth primary longest..... <i>Haliaeetus</i>	230

Genus ELANUS Savigny

Elanus Savigny, 1809, Descr. Egypte 1: 69, 97. Type, by monotypy, *Elanus caesus* Savigny = *Falco caeruleus* Desfontaines

Bill small, wide at base, compressed near tip; culmen sharply curved from cere; festoon distinct. Nostrils oval, nearly horizontal, protected by long loreal bristles. Wings long and pointed, reaching beyond tip of tail; second primary (as.) longest. Tail moderately long, slightly forked. Tarsi short and stout, feathered in front for more than half their length; naked parts reticulated throughout. Toes strong, reticulated above except near claws; lateral toes subequal in length. Middle claw keeled, the others rounded beneath.

The genus contains small hawks allied to Kites (*Milvus*), occurring in America, Africa, and Asia to Australia. Only one species (*E. caeruleus*) represented in India.

124. Blackwinged Kite. *Elanus caeruleus vociferus* (Latham)

Falco vociferus Latham, 1790, Index Orn., 1: 46

(India = Coromandel Coast, ex Sonnerat, apud Hartert)

Baker, FBI No. 1789, Vol. 5: 125

Plate 11, fig. 7, facing p. 208

LOCAL NAMES. *Kāpāssi* (Hindi; Bengali); *Māsunwā* (Oudh); *Chānwā* (Nepal); *Adavi ramadasu* (Telugu); *Argellur* (Yerkali); *Velli-eriyān* (Malayalam); *Kurulla goya*, *Ukussa* (Sinhala).

SIZE. House Crow —; length c. 33 cm. (13 in.).

FIELD CHARACTERS. A small dainty grey and white hawk. Crown, nape, back, rump, and upper tail-coverts pale ashy grey; rest of head and neck, underparts, and tail pure white. A black line from lores to behind the blood-red eyes, and black patches on wing shoulders conspicuous at rest and also in flight. Tips of closed wings (black) extend beyond short square (slightly forked) tail. Sexes alike.

In flight, colour pattern resembles Pale Harrier (q.v.) which also has black wing tips (primaries). But larger size of Harrier slimmer streamlined



x c. 1

body, longer pointed wings, buoyant sailing flight, and absence of black shoulder-patches readily distinguish it.

Young (immature). Brownish ashy above scalloped paler. Wing coverts (black and grey) also edged with whitish. Remiges and rectrices tipped white. Breast tinged with buff or finely streaked with fulvous.

STATUS, DISTRIBUTION and HABITAT. Resident. Widely but patchily distributed from W. Pakistan [Baluchistan (straggler), Sind, Bahawalpur, W. Punjab] east to Assam plains and Manipur, and from the Himalayan foothills (from c. 1600 m.) and terai south to Kanyakumari; up to c. 1200 m. in the peninsular hills. Nepal, chiefly terai and lowlands, but recorded at c. 1370 m. (Biswas). Ceylon (all zones to c. 2100 mm.); Laccadive Islands.

Affects deciduous biotope: sparse savannah forest, secondary scrub country and grassland interspersed with cultivation; riverain tamarisk and kandi (*Prosopis*) jungle in W. Pakistan and semi-desert areas.

Extralimal, east to S. Yunnan, south to N. Tenasserim and the Indo-chinese countries.

The darker nominate race inhabits practically all Africa and Madagascar; occasionally found in S. Europe.

LOCAL MOVEMENTS. Seasonal local fluctuations, and appearances and disappearances often recorded, e.g. in Coorg ('regular winter migrant'—F. N. Betts), but no precise data.

GENERAL HABITS. Keeps singly or in widely scattered pairs. Somewhat crepuscular; more so in some localities and at certain times than others, presumably dependent on habits of the prevailing food supply. Adopts a favourite patch of open grass-and-scrub jungle, occupying the same pole or tree-top within it day after day. From this perch surveys the surroundings — cocking up the tail from time to time, opening and closing it, raising and lowering it gently or jerking it up and down between the drooping wings — and pounces on any prey that stirs on the ground. More usually quarters the territory, flying and sailing in wide circles 30 metres or so above, turning every now and then to face the wind and hover like a kestrel ('over a minute' — SA) to scan the ground. On suspicion of movement, parachutes obliquely down a few metres to investigate more closely — wings open and upraised back to back, with only the tips quivering. The parachute descent, controlled by slight up and down manipulations of the tail, is often interrupted with bouts of stationary hovering to make sure, the legs being gradually let down in readiness at the same time. Finally when within striking range, the wings are pulled in and the bird drops or stoops on the quarry with a rush, bearing it away in its claws.

Flight sluggish, with deliberate wing-beats, strongly reminiscent of a gull or roller (in head-on silhouette also of a flying fox), alternated with spurts of sailing. When in pursuit, bird capable of swift falcon-like dash. Once carried off a wounded quail 'with quite the rapidity and dash of a peregrine' (Butler, SF 3: 448).

Roosts communally at night in leafy trees, 15–20 birds or more converging on the selected one at dusk from over a wide area.

FOOD. Locusts, grasshoppers, crickets, and other insects. Lizards, field rats and mice, young and sickly birds, etc. Snake and frog also taken among stomach contents.

VOICE AND CALLS. Normally silent. A thin high-pitched squeal occasional. A soft whistle as of man (A. E. Jones).

BREEDING. *Season*, very extended, varying locally to cover practically entire year, with a marked recession in April and May. *Nest*, loose, untidy, crow-like; of twigs, lined with roots and grass; sometimes unlined. Placed in a small tree, seldom above c. 9 metres from ground. *Eggs*, 3 to 5 or 6 — most commonly 3 or 4 — richly coloured, handsome, highly variable. Ground colour white to pale cream, buff, or yellowish stone, boldly blotched, smeared and spotted with deep red or reddish brown, occasionally with a few scattered specks of blackish blood-red. Last laid egg of a clutch often very poorly marked. Average size of 100 eggs 39.3×30.9 mm. (Baker). Both sexes share all domestic chores; major part in nest-building and incubation by female, in foraging for young by male.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from skull)	Tarsus	Tail
♂♂	260-276	20-23	30-37	116-124 mm.
♀♀	262-283	23-24	c. 36	119-130 mm. (SA)

COLOURS OF BARE PARTS. Iris, adult crimson; imm. yellow or yellow-brown. Bill black; cere and gape pale yellow. Legs and feet deep yellow; claws black.

Genus AVICEDA Swainson

Aviceda Swainson, 1836, *Classif. Bds.*, 1: 300. Type, by subsequent designation, *Aviceda cuculoides* Swainson, 1837, *op. cit.* 2: 214

Baza Hodgson, 1837, *Jour. Asiat. Soc. Bengal*, 5: 777. Type, by original designation, *Baza syama* Hodgson

Small to medium sized hawks. Head with thin upstanding crest. Bill strong and well curved. Cutting edge of upper mandible furnished with two sharp conical 'teeth' on each side near tip; lower mandible with three or four pointed serrations on each side near tip. Cere small; nostril very narrow, slanting, placed at anterior edge of cere, partly covered by a membrane. Lores partly feathered as in Honey Buzzard (*Pernis*). Tarsus short, stout, scutellated in front and above the toes, reticulated elsewhere; feathered in front on upper third or more. Claws small, well curved, almost subequal in length. Wings moderately pointed. Tail longish, square-ended or very slightly graduated.

Key to the Species

	Page
Upper plumage brown, fourth primary longest..... <i>A. jerdoni</i>	215
Upper plumage black, third primary longest..... <i>A. leuphotes</i>	218

AVICEDA JERDONI (Blyth)

Key to the Subspecies

Larger, wing over 320 mm..... <i>A. j. jerdoni</i>
Smaller, wing under 315 mm..... <i>A. j. ceylonensis</i>

125. **Blyth's Baza or Northern Brown Lizard Hawk.** *Aviceda jerdoni jerdoni* (Blyth)

Pernis Jerdoni Blyth, 1842, Jour. Asiat. Soc. Bengal, 11:464
(no type locality = Malacca)

Baker, FBI No. 1824, Vol. 5:174

LOCAL NAMES. None recorded.

SIZE. Jungle Crow; length c. 48 cm. (19 in.).

FIELD CHARACTERS. A moderate sized brown hawk with rufous and black head and a prominent upstanding black occipital crest, narrowly white-tipped. Chin and throat rufous and white, with a bold black mesial stripe. Breast rufous-brown; rest of underparts conspicuously barred with rufous-brown and white. Tail brown with three dark bands, the terminal one broadest and darkest.

On a casual view could be confused with the Crested Goshawk (*Accipiter trivirgatus*) of somewhat similar coloration, also crested, q.v.

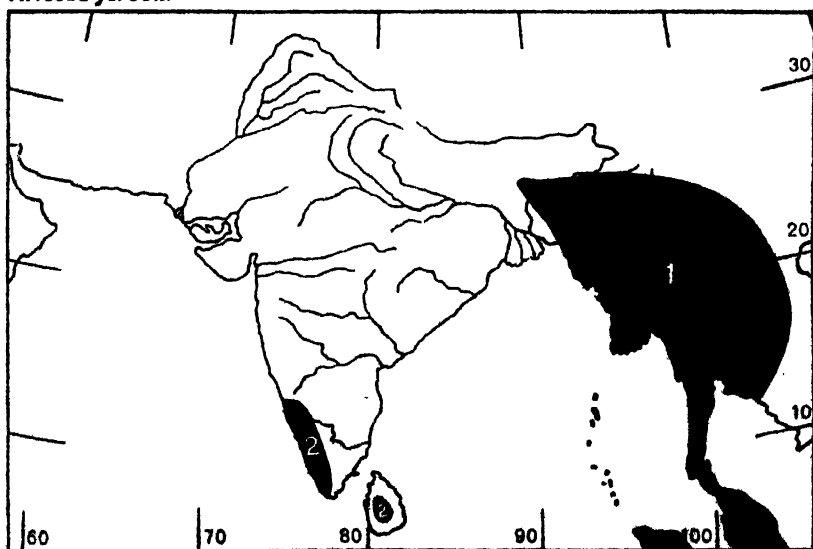
Female (adult). Much paler throughout, with breast fulvous-white instead of rufous.

Young (immature). Like adult female, but paler; with four, or sometimes five, distinct dark bands in tail, the basal one partly concealed; bases of rectrices much mottled with white. Still younger birds have feathers of upper plumage fringed with white, and underparts even paler and more feebly barred and streaked than in female.

STATUS, DISTRIBUTION and HABITAT. Resident. Rare. Darjeeling district (W. Bengal), Sikkim to eastern Assam, between c. 350 and 1800 m. altitude, with some seasonal up and down movement. Confined to evergreen foothills biotope.

Extralimital. Burma, Thailand, Malay Peninsula, Sumatra.

Aviceda jerdoni



Range

1 *A. j. jerdoni*; 2 *A. j. ceylonensis*

GENERAL HABITS. Largely crepuscular. Even lesser known than of the southern race (No. 126). Usually keeps in pairs, but family parties of 3 to 5 occasionally seen flying and sailing in circles at treetop height at the edge of a forest clearing. Flight rather sluggish.

FOOD. Lizards, grasshoppers, and other large insects. The stomach contents of a specimen (Kurseong) included two Agamid lizards (*Japallura variegata*), several longicorn beetles and mantises (Coleoptera, Orthoptera) — D'Abreu, JBNHS 20:518.

VOICE and CALLS. Not recorded.

BREEDING. Only two authentic records, both from Darjeeling district, W. Bengal, at c. 610 and 1825 m. elevation; April and June. The *nests* — small and compact, of sticks, lined with green leaves — were placed among stout branches of large forest trees at heights of c. 10 and 20 metres respectively. *Eggs*, 2 in each, closely resembling Shikra's (*Accipiter badius*), greyish white, stained from contact with leafy nest-lining. (Sometimes with sparse reddish blotches and specks.) Fine-textured, smooth, broad ovals. Average size of the 4 eggs 44.7×36.5 mm. (Baker).

Share of the sexes in the nesting chores, and incubation period, unrecorded.

MUSEUM DIAGNOSIS. Wing structure of *A. jerdoni* differs from *A. leuphotes* in having the 4th primary (as.) longest instead of 3rd; or sometimes 4th and 5th subequal.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	327 (Sumatra) - - 360 (Sikkim)	29-30	35-40	210-244 mm.

COLOURS OF BARE PARTS. Iris golden yellow. Bill plumbeous black, base bluish slate; tip and culmen quite black; cere pale bluish plumbeous to almost black. Legs and feet chrome yellow or 'white slightly tinged with blue' (Hume), or 'tarsus china white' (Stevens); claws horny black (Baker).

126. Legge's Baza or Southern Brown Lizard Hawk. *Aviceda jerdoni* ceylonensis (Legge)

Baza ceylonensis Legge, 1876, Stray Feathers, 4:247 (near Kandy, Ceylon)

Baker, FBI No. 1825, Vol. 5:175

Plate 13, fig. 3, facing p. 240

LOCAL NAMES. *Kurulla goya* (Sinhala); *Parundu* (Tamil); *Prapparundu* (Malayalam).

SIZE. Jungle Crow; length c. 48 cm. (19 in.).

FIELD CHARACTERS. Similar to the last (No. 125) sex for sex and age for age, only slightly smaller (see Measurements). General shape in air, and wing action, reminiscent of a small buzzard. Crest depressed in flight; characteristically erect from occiput when bird at rest.

STATUS, DISTRIBUTION and HABITAT. One of the peculiar discontinuously distributed Indo-Malayan forms separated from its nearest east-Himalayan relative by at least 1900 km. of ecologically unsuited country. Resident, but scattered and rare in south-west India south of c. 12°N. lat. — W.

Mysore and Kerala (including Coorg and Wynaad), and Ceylon (hill zone in Central and Uva provinces). Affects evergreen forest biotope in the foothills between c. 150 and 900 metres altitude.

GENERAL HABITS. Like No. 125, shy and rather crepuscular. Sluggish on the wing, flying with strong flaps alternated with short intervals of gliding. Keeps in pairs or family parties of 3 to 5 — the young birds distinguishable by their much paler coloration — to hilly forested country where sometimes met with on the edge of sholas and clearings. Still-hunts lizards and large insects, pouncing on them from its look-out perch in a leafy tree. Prey carried in beak not in talons. Rarely seen except when flying in circles at treetop height or soaring aloft. On approach of breeding season much given to extravagant aerobatics accompanied by excited mewing screams, *kip-kip-kip* or *kikiya*, *kikiya*, etc., at times confusingly like the calls of the Palm Squirrel (*Funambulus*).

DISPLAY. The pair soar round each other in circles high up in the air. The male (?) suddenly nose-dives steeply with half-closed wings for 10 to 15 metres, uttering a loud, sharp *kip-kip-kip*; then, using the momentum, he doubles upon himself and zooms almost vertically upwards. When on the crest of the curve, standing on his tail as it were, and seemingly about to stall and topple over backwards, he presently rights himself and continues to soar around. These spectacular antics are repeated at short intervals (F. N. Betts, JBNHS 36: 258; 50: 251).

FOOD. Lizards, frogs, large insects, and other small animals. *Calotes calotes* and field rat (*Golunda ellioti*) recorded in Ceylon (Phillips).

VOICE and CALLS. Besides the courtship cries, a loud plaintive mewing *pee-ow* uttered by both sexes while circling in the air (W. W. A. Phillips). Also a conversational 'long drawn mournful *gweeer* with something of the intonation of a serpent eagle's cry' (Mrs Lushington).

BREEDING. Copulation accompanied by loud cries observed in tree on 26 September. *Season*, in SW. India normally February through April; in Ceylon during the NE. monsoon, from c. November to May. *Nest*, a well-made smallish structure (shallow cup) of leafy twigs, occasionally lined with grass and roots but always with fresh green leaves. Built 7 to 20 metres up in a leafy tree in humid forest; sometimes in trees standing in tea plantations. *Eggs*, 2 or 3, greyish white getting stained during incubation; indistinguishable from those of the northern race. Average size of 32 eggs 44.9 × 33.6 mm. (Baker). Both birds participate in building the nest. Share in incubation, and incubation period, unrecorded.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	299-312	28-29	36-37	201-211 mm.

COLOURS OF BARE PARTS. As in the nominate race (No. 125).

AVICEDA LEUPHOTES (Dumont)

Key to the Subspecies

- Band across chest mainly rufous and chestnut.....*A. l. leuphotes*
- Band across chest nearly all black.....*A. l. syama*

127. **Indian Blackcrested Baza or Lizard Hawk.** *Aviceda leuphotes leuphotes* (Dumont)

Falco leuphotes Dumont, 1820, Dict. Sci. Nat., 16: 217 (Pondicherry)
Baker, FBI No. 1822, Vol. 5: 171

Plate 11, fig. 9, facing p. 208 and Plate 13, fig. 5, facing p. 240

LOCAL NAME. *Prapparandu* (Malayalam).

SIZE. Pigeon \pm ; length c. 33 cm. (13 in.).

FIELD CHARACTERS. A handsome, prominently crested black and white hawk with barred underparts and black belly.

Adult. *Above*, black, including head with long upstanding occipital crest, neck, back, rump, tail-coverts and tail. Conspicuous white and chestnut blotches on scapulars and flight feathers. *Below*, foreneck and upper breast black; a broad white gorget below it, succeeded by a black-and-chestnut band. Lower breast and flanks buffy white boldly barred with chestnut. Centre of abdomen, vent, and under tail-coverts black. Sexes alike.



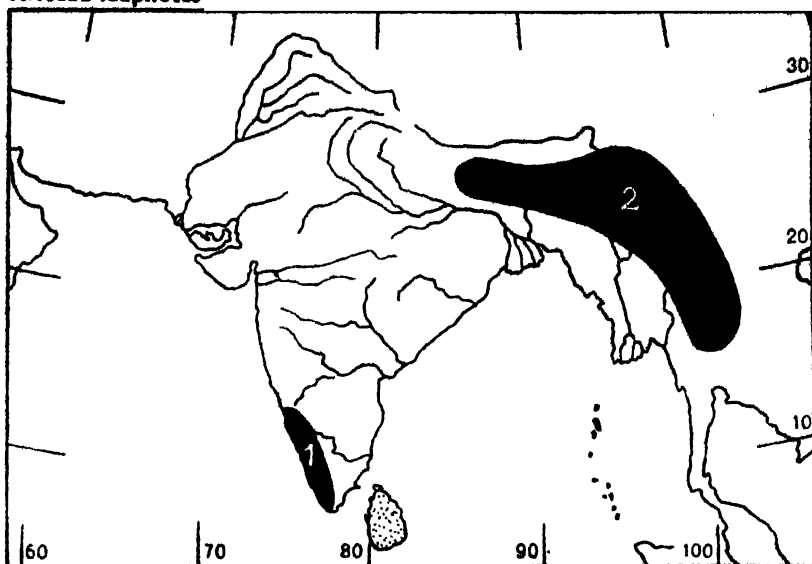
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In overhead flight paler underside of tail with contrasting black abdomen and vent, dark-barred underparts and white breast band are leading pointers.

Young (immature). Unrecorded.

STATUS, DISTRIBUTION and HABITAT. Resident. Uncommon. Kerala (including Wynaad, Nilgiri Hills); possibly also Coorg and western Mysore (Malnad) though as yet unrecorded thence. Eastern Nepal, Sikkim, northern West Bengal, East Pakistan, to eastern Assam north of Brahmaputra river; terai and up to c. 1200 m. elevation (but see under 128 — *A. l. syama*). A specimen (ssp?) collected in Bastar dist., eastern Madhya Pradesh, in April (JBNHS 62: 556). Rare NE. monsoon (winter) visitor to Ceylon in the low country (all zones), apparently the E. Himalayan form. Status of the two races insufficiently understood owing to paucity of relevant skins for study (see H. G. Deignan 1948, *Auk*, 65: 85). Frequents evergreen forest in the neighbourhood of clearings and wide streams, chiefly in foothills country.

Has the same curious widely discontinuous Indo-Malayan distribution as *Aviceda jerdoni*. More material from Kerala may show that as in that species the resident southern population is discrete.

Aviceda leuphotes

Residential range Winter extension: 1, 2 (?)

1 *A. l. leuphotes*; 2 *A. l. syama*

GENERAL HABITS. Met with singly or in small (family ?) parties; large gatherings of up to 20 birds or so have been recorded. Somewhat crepuscular; more active in cloudy overcast weather and at dusk than during the glare of mid-day. Perches upright high up in the canopy of a lofty forest tree, unnoticed till it makes its aerial sorties after flying insects, returning to a nearby perch after each capture. Insects always seized in the feet (cf. No. 126); sometimes in the air, sometimes picked off a leaf, the bird fluttering or hovering momentarily to do so. When disturbed the birds promptly commence to soar in circles above the tree-tops, sometimes ascending to considerable heights. Normal flapping flight reminiscent of a crow's, and interrupted by short spurts of sailing.

VOICE AND CALLS. A soft, quavering plaintive squeal or whistle, recalling the Pariah Kite's; also described as a shrill gull-like mewing.

FOOD. Chiefly lizards, frogs, large grasshoppers, mantises, and other insects. Bats and small birds only occasionally. We have observed an individual at dusk and dawn day after day flying into and criss-crossing through swarms of yellow wagtails arriving at and leaving their roosts in sugarcane fields in Kerala, making timid unsuccessful dashes at birds within easy reach, but only rarely securing one.

BREEDING. *Season*, in NE. India April to June; in Kerala between February and July, mainly March/April. *Nest*, a well-made platform of thin sticks with the central depression c. 20 cm. across and 5 to 10 cm. deep. Generally well lined with grass and fibre, overlaid with a bed of green leaves which are renewed from time to time. *Eggs*, 2 or 3, like those of *Accipiter badius*, broad, fine-textured and smooth ovals, greyish white,

rarely with specks and blotches of reddish at the broad end. Average size of 24 eggs 37.4×31.1 mm. (Baker).

Both sexes participate in nest-building and incubation. Incubation period and share in feeding young unrecorded.

MUSEUM DIAGNOSIS. Distinguished from the Burmese race (*A. l. syama*) by the band across breast being largely intermixed with rufous and chestnut *v.* almost wholly black.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	227-243	20-22	26-27	130-145 mm.

COLOURS OF BARE PARTS. Iris purple-brown or crimson-brown. Bill deep slaty or horny-plumbeous; upper mandible tipped black, lower whitish, cere plumbeous-blue. Legs and feet dull plumbeous to plumbeous-blue; claws horny brown (Baker).

MISCELLANEOUS. When freshly killed, the bird 'has a most peculiar and disagreeable odour; what might be termed a regular frog-like or bug-like smell; nor does this wear off till the skin has been exposed to air for some considerable time' (W. Davison, SF 6: 24-5).

128. Burmese Blackcrested Baza or Lizard Hawk. *Aviceda leuphotes syama* (Hodgson)

Baza Syama Hodgson, 1836, Jour. Asiat. Soc. Bengal 5: 777

(Lower region of Nepal)

Baker FBI No. 1823, Vol. 5: 173

LOCAL NAMES. *Daokwa*, *Daoling* (Cachar).

SIZE. Same as No. 127, Pigeon \pm ; length *c.* 33 cm. (13 in.).

FIELD CHARACTERS. A handsome, prominently crested black and white hawk with barred underparts and black belly. Differs from 127 in having the upper plumage blacker with less chestnut markings, and the breast band below the white gorget almost wholly black (without chestnut admixture).

Young (immature). Like adult but with more chestnut and white in upper plumage.

STATUS, DISTRIBUTION and HABITAT. Uncertain and rather confused. According to H. G. Deignan (*Auk*, 1948, 65: 85), the latest reviewer of this species, *syama* is the breeding form of N. Burma, Assam, and the lower slopes of the E. Himalayas west to Nepal. He considers the breeding bird of Kerala, S. Burma, and N. & E. Thailand to be the nominate *leuphotes*. As Deignan points out, however, it is by no means certain that the Kerala-breeding race is in fact inseparable from that of N. Thailand, as at present assumed. More material from Kerala is needed to settle the point. He suggests that the birds found in Ceylon in winter may be migrants of the east Himalayan population (*syama*).

Like 127, inhabits evergreen forest biotope; broken plains and foothills country up to *c.* 1000 m. elevation.

GENERAL HABITS, FOOD, VOICE, etc. No differences from 127 recorded.

MUSEUM DIAGNOSIS. Distinguished from nominate *leuphotes* by the band across the breast being nearly all black *v.* largely intermixed with rufous and chestnut.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	221-246	20-23	25-30	130-149 mm. (Baker)

COLOURS OF BARE PARTS. As in the nominate race.

Genus PERNIS Cuvier

Pernis Cuvier, 1817(1816), Règne Animal., 1: 322. Type, by monotypy, *Falco apivorus* Linnaeus

Cf. Stresemann, E., 1940, Archiv. f. Naturg.: 137-93

Distinguished from all other accipitrine genera by having the lores, sides of head, forehead, and chin, covered with small scale-like feathers, with no bristles or prolonged shafts. Bill weak, rather long, not much hooked; festoon small or absent. Cere nearly as long as rest of bill. Nostrils long, narrow, oblique; upper margin membranous. Wings long; 3rd and 4th primaries (as.) subequal and longest, 5th a little shorter. Tail moderately long; slightly rounded. Tarsus stout, short, and feathered on the upper half in front, the naked parts covered with hexagonal scales; toes long, covered above with bony transverse shields, all divided except the last two or three; claws long and slightly curved, the middle one dilated on the inner side.

The genus is found in Europe and Africa to Central Asia, extending to the Malay Archipelago and China.

PERNIS PTILORHYNCHUS (Temminck)**Key to the Subspecies**

- Black subterminal and median bands on tail nearly as wide as paler bands.....*P. p. ruficollis*
 Black subterminal and median bands on tail much narrower than paler bands..... *P. p. orientalis*

129. Siberian Honey Buzzard. *Pernis ptilorhynchus orientalis* Taczanowski

Pernis apivorus orientalis Taczanowski, 1891, Fauna, Orn. Sib.-Orient. pt. 1: 50
 (in Mém. Acad. Imp. Sci. St. Pétersb. (7), 39) (Eastern Siberia)
 Baker, FBI No. 1820, Vol. 5: 168

LOCAL NAMES. As in 130.

SIZE. Pariah Kite \pm ; length *c.* 68 cm. (27 in.).

FIELD CHARACTERS. Doubtfully distinguishable in the field from Crested Honey Buzzard (No. 130) by its different tail pattern in which the black subterminal and median bands are narrower than the paler (mottled grey) bands that separate them. This character is more noticeable in overhead soaring flight, but is variable and not always a reliable guide. Sexes alike; female larger

STATUS, DISTRIBUTION and HABITAT. Uncommon winter visitor to N. India. Possibly more frequent than supposed also elsewhere in the subcontinent but not differentiated from 130, q.v.; one specimen from as far south as Ceylon (Mannar — Phillips).



Adult, pale form



Young

Honey Buzzard, overhead view
(Diagrammatic sketches by L. Tinbergen)

Extralimital. Breeds in S. Siberia from SW. Altai to the Amur region and the mountains of Hondo (Japan); probably also in Manchuria and N. China. In winter south to Burma, and S. China (Peters).

'Japan and northeastern Asia where it is highly migratory' (Vaurie & Amadon, Am. Mus. Novit., No. 2111, Oct. 29, 1962).

GENERAL HABITS, etc. Nothing specifically recorded. See 130.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	432-483 (few 460+)	33-37	47-50	242-267 mm. (Baker)

COLOURS OF BARE PARTS. As in 130.

130. Crested Honey Buzzard. *Pernis ptilorhynchus ruficollis* Lesson

Pernis ruficollis Lesson, 1830, *Traité d'Orn.*, livr. 1: 77

('patric inconnue' = Bengal)

Baker, FBI No. 1819, Vol. 5: 167

Plate 10, fig. 6, facing p. 192

LOCAL NAMES. *Shahutela*, *Mādkare* (Hindi); *Madhava* (Nepal); *Tenu geddu* (Telugu); *Ten parandu* (Tamil); *Jen alawa* (Kannada); *Iutalu* (Yerkali); *Malsuwari* (Mhari); *Katta parantha*, *Ten kotichi* (Malayalam); *Rajaliya* (Sinhala).

SIZE. Same as 129; Pariah Kite \pm ; length c. 68 cm. (27 in.).

FIELD CHARACTERS. Extremely variable in coloration. One of the commonest phases greyish brown above with darker grey head; pale brown below narrowly cross-banded with white. A short blackish nuchal crest seen in profile when slightly raised. Underside of wings silvery grey with close dark barring; rounded greyish tail with broad blackish subterminal and median cross-bands separated by about equally broad pale ones; but tail pattern also variable. Sexes alike.

Slenderer head and longer neck readily distinguish it from Short-toed Eagle which it resembles in overhead flight.

STATUS, DISTRIBUTION and HABITAT. Resident, with considerable local movements depending on food supply. West Pakistan, and all India from c. 1800 metres in the Himalayas south to Kanyakumari and Ceylon (partly winter visitor), east to Assam and E. Pakistan. Inhabits deciduous and semi-evergreen well-wooded country, hill and plain, affecting forest glades, groves of trees about towns, villages and cultivation, even in semi-desert areas, e.g. Bahawalpur, Rajasthan, N. Gujarat.



x c. 1

Extralimital. East to Tonkin and Laos. Probably also SW. Yunnan (Peters). 'Somewhat migratory' (Vaurie & Amadon, Am. Mus. Novit., No. 2111 — Oct. 29, 1962).

GENERAL HABITS. Usually seen singly or in pairs soaring aloft and circling on motionless wings, or perched on a tree-top; in urban and suburban localities invariably mobbed and chivvied by House and Jungle Crows, often abetted by parakeets and other birds. Normal flight with steady wing-beats punctuated with occasional spurts of sailing. Numbers gather to roost at night in groves of large leafy trees, e.g. *Dalbergia*.

FOOD. Chiefly honey and larvae of bees — even of the ferocious Rock Bee (*Apis dorsata*) — either from combs within natural tree hollows or those festooning the branches. Bits of the comb are broken off regardless of the onslaughts of the infuriated insects (exact method in case of exposed combs not recorded). If the chunk is too large and drops down, the bird descends to deal with it on the ground, digging into the cells with its bill; if of manageable size it is carried off to a perch on a bough, held under foot and torn with the bill, the honey and larvae being gulped down. The dense covering of scale-like feathers on the face afford adequate protection against the stings, but how the eye escapes is not clear. Stomach and crop contents of specimens also show considerable quantities of wax. Whether, as in Honeyguides, this is deliberately swallowed, and digested, is not known. Large insects, reptiles, mice and young birds are also taken. One reported devouring an oriole (Donald). Alleged to rob village chickens at times.

VOICE and CALLS. A single high-pitched screaming whistle *whewewew* uttered from a perch with crest slightly raised; also on the wing. Sometimes calls during the night (?).

BREEDING. *Season*, April, May, and early June over most of northern and peninsular India; in south India apparently more birds lay in February than later. No nest actually discovered in Ceylon though copulation once

observed in January, and young ex nest being fed in May (Phillips 1953). *Nest*, a compact platform of sticks *c.* 40–45 cm. in diameter and 20 cm. deep, the inner cup lined with a thick layer of dry leaves; rarely green ones. Placed in large mango, banyan, and suchlike leafy trees, or in a casuarina, or even date or coconut palms, from 6 to 20 metres up. *Eggs*, normally 2, smooth-surfaced broad ovals, almost equal at both ends. Handsome but extremely variable in ground colour and markings: pale cream, pale reddish- or yellowish buff, freckled, mottled, or blotched in varying degree with reddish brown or chestnut-brown. Some eggs closely resemble those of Kestrel or Sparrow-Hawk; some are mistakable for those of the Kite, but Baker points out that the inner membrane is *always* yellow, never green as in the latter. Average size of 80 eggs 52.8×42.8 mm. (Baker). Both sexes share in nest-building, incubation, and feeding the young. Incubation period about 32 days. Chick when *c.* 15 days old, covered with white powder-puff down all over except head and neck, where it is buffy-cream colour.

MUSEUM DIAGNOSIS. According to Stresemann¹ the race *ruficollis* has 'tail-wing' index (length of tail multiplied by 100 and divided by length of wing) usually under 65. 'Wing-tip' (distance from tip of longest secondary to tip of longest primary) usually under 110 mm.; wing length 392–460 mm.

MEASUREMENTS (of Indian birds)

	Wing	Bill (from skull)	Tarsus	Tail
♂♂	382–417	36–42	48–57	245–262 mm.
♀♀	398–445	38–42	50–60	250–276 mm. (SA)

COLOURS OF BARE PARTS. Iris golden yellow to orange-red, sometimes with a very fine golden ring round pupil; browner in young birds. Bill slaty black; lower mandible paler (whitish) with black tip; cere blackish plumbeous. Legs and feet yellow; claws black. In 15-day old downy chick: Iris brown. Bill black; cere greyish. Legs and feet pinkish flesh-colour.

MISCELLANEOUS. Nematode worms (*Pelecitus* sp.) recorded from under skin of toes, especially at base of claws (Sálim Ali 1943, JBNHS 44: 23).

Genus *MILVUS* Lacépède

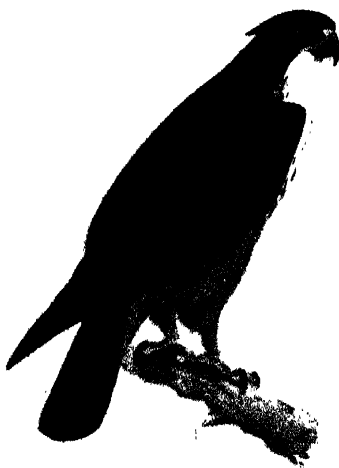
Milvus Lacépède, 1799, Tabl. Ois.: 4. Type, by tautonymy, *Falco milvus* Linnaeus

Hawks distinguished by their long, forked tails. Bill comparatively weak; culmen slightly curved at base, sharply rounded but distinct; cere well developed, with oval, oblique nostril at its anterior edge. Wing long and pointed, reaching almost to tip of tail; 3rd and 4th primaries (as.) longest. Tarsus short, feathered for about half its length, the naked lower portion with broad shields in front, reticulated

¹ Stresemann, E. (1940): Review of the genus *Pernis*. *Archiv für Naturgeschichte*, pp. 137–93.

PLATE 12

1 *Pandion h. haliaetus*, Osprey (203). 2 *Accipiter t. indicus*, Crested Goshawk (144). 3 *Falco p. peregrinator*, Shahn Falcon (211). 4 *Microhierax caerulescens (burmanicus)*, Redbreasted Falconet (204 RE). 5 *Falco t. interstinctus*, Kestrel (223). 6 *Spilornis c. burmanicus*, Crested Serpent Eagle (199). 7 *Lophotriorchis k. kienerii*, Rufousbellied Hawk-Eagle (165).



Am. Audubon
1940

behind and at sides. Toes short, scutellate above; lateral toes uneven; claws moderately curved; middle claw dilated on the inside.

Represented throughout the Old World; within our limits by two species, one of which is of uncertain status.

Key to the Species

Depth of fork in tail (i.e. distance outer tail-feather projects beyond central tail-feather) greater than length of tarsus.....*M. milvus*

Depth of fork lesser than length of tarsus.....*M. migrans*

131. European or Red Kite. *Milvus milvus milvus* (Linnaeus)

Falco milvus Linnaeus, 1758, Syst. Nat., ed. 10, 1: 89 (South Sweden)

Not in Baker, FBI

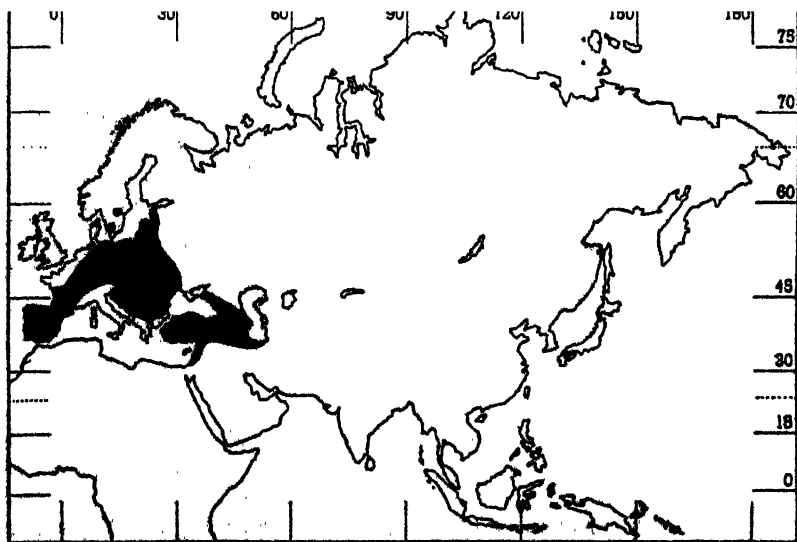
Plate 10, fig. 4, facing p. 192

LOCAL NAMES. As for Pariah Kite.

SIZE. Pariah Kite; length c. 61 cm. (24 in.).

FIELD CHARACTERS. Differs from the familiar Pariah Kite in being rusty brown overall, with paler (whitish) head, dark-streaked rust-red underparts, and bright rufous deeply forked tail. In overhead flight the reddish general coloration, pale head, black primaries ('splayed fingers'), with a prominent pale whitish patch at their bases, pale abdomen and vent, and red tail are diagnostic. Sexes alike, more or less also in size.

Milvus milvus



■ Breeding range

STATUS, DISTRIBUTION and HABITAT. Uncertain. Vagrant or irregular (?) winter visitor. Definitely identified at Pung Bet, Little Rann of Kutch

23°N., 70°E., March 1945 (Sálim Ali 1954, JBNHS 52: 393); Jasan, Gujarat, March 1964 (Shivraj Kumar, *ibid.* 61(2): 446); Chilka lake and Puri, Orissa, January 1963, 1964 (Jayakar & Spurway, *ibid.* 62: 301).

Extralimital. Breeds in England (locally), Scandinavia north to lat. 61°N.; east to Russia, south to NW. Africa, Asia Minor and Palestine; Canary Is. Migratory in the northern part of its range but not crossing the Sahara (Peters).

GENERAL HABITS etc. In Kutch a loose gathering of over 50 birds had assembled for scraps around a shooting camp in lightly wooded semi-desert country surrounded by barren salt desert.

VOICE and CALLS. A squealing whistle similar to the Pariah Kite's but shriller.

MUSEUM DIAGNOSIS. For details of plumages see Witherby 1939, 3: 86-7.

MEASUREMENTS

	Wing	Bill (from cere)	Tarsus	Tail	
				central	outer
♂ ♂	480-500	27-30	58-64	220-250	300-345 mm.
				Depth of fork 60-110 mm.	
♀ ♀	480-515	—	—	220-260	310-365 mm.

COLOURS OF BARE PARTS. Iris amber-yellow; skin round eye yellow. Bill black at tip, yellow at base and cere. Legs and feet yellow (Witherby).

MILVUS MIGRANS (Boddaert)

Key to the Subspecies

	Page
A Head in adults whitish with black streaks..... <i>M. m. migrans</i>	226
B Head in adults fulvous with black streaks.....1	
1 Smaller; wing ♂ 420-475 mm., ♀ 432-499; white underwing patch inconspicuous..... <i>M. m. govinda</i>	227
Larger; wing ♂ 475-529 mm., ♀ 480-552; white underwing patch conspicuous..... <i>M. m. lineatus</i>	229

132. Black Kite. *Milvus migrans migrans* (Boddaert)

Falco migrans Boddaert, 1783, Table Pl. enlum.: 28

(restricted type locality France, *apud* Hartert, *ex* Daubenton, pl. 472)

Baker, FBI No. 1786, Vol. 5: 121

LOCAL NAMES. Same as for Pariah Kite.

SIZE. Pariah Kite; length *c.* 61 cm. (24 in.).

FIELD CHARACTERS. Differs from the Pariah Kite (No. 133) in having the head and neck in adults whitish (*v.* fulvous-brown) with black shaft streaks. Upperparts paler brown; underparts more rufous. Sexes alike.

STATUS, DISTRIBUTION and HABITAT. Resident (breeding) in W. Pakistan (Quetta, NE. Baluchistan); in winter probably spreading to Sind, Kutch (?).

Extralimital. Breeds from Spain, S. France, Germany, and Finland south to NW. Africa, SE. Europe, Asia Minor, Kirghiz steppes, and NE. Baluchistan. Winters in N. Africa (Peters).

GENERAL HABITS etc. Same as of Pariah Kite q.v.

MUSEUM DIAGNOSIS. For details of plumages see Witherby 1939, 3: 96.

MEASUREMENTS

	Wing	Bill (from cere)	Tarsus	Tail	
				central	outer
♂♂	417-452	24-27	53-60	200-235	230-260 mm.
				Depth of fork 20-40 mm.	
♀♀	430-465	—	—	—	—
				(Witherby)	

COLOURS OF BARE PARTS. As in Pariah Kite.

133. **Pariah Kite.** *Milvus migrans govinda* Sykes

Milvus Govinda Sykes, 1832, Proc. zool. Soc. Lond.: 81 (Dukhun)

Baker, FBI No. 1787, Vol. 5: 122

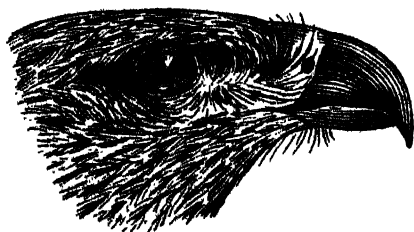
Plate 11, fig. 5, facing p. 206

LOCAL NAMES. *Cheel* (Hindi and Bengali); *Kuril* (Santhali); *Il* (Chamba); *Malla gaddā* (Telugu); *Paria parandu*, *Kalu parandu* (Tamil); *Genda* (Mhari); *Rajaliya* (Sinhala); *Chilana*, *Mugacharani* (Assam); *Chakki parandu* (Malayalam); *Ghār* (Marathi); *Siriūn* (Sind).

FIELD CHARACTERS. A large dark fulvous-brown hawk distinguishable from all similar birds of prey by its deeply forked tail, particularly conspicuous in flight. Sexes alike.

Young (immature). Overall pale brown, speckled and streaked with fulvous. Head brown, streaked with pale fulvous; a white patch under eye.

Upper plumage brown, darker than adult, the feathers tipped or edged paler. Underparts brown with broad whitish or fulvous streaks. In older young these streaks narrower with black shafts. Tail more strongly barred or rayed.



× c. 1

STATUS, DISTRIBUTION and HABITAT.

Resident. Common throughout both Pakistans, all India (plains and to c. 2200 metres altitude in the Himalayan and peninsular hills), Nepal, Ceylon (low country Dry Zone), Andaman Is. Affects urban localities and human habitations on the countryside, including outlying nomadic herdsmen's encampments.

Extralimital. Burma; Malaysia (occasional).

LOCAL MIGRATION from heavy-rainfall localities to drier areas observed before commencement of monsoon, but precise data lacking.

GENERAL HABITS. Gregarious about towns and villages. A confirmed commensal of man, and useful and efficient scavenger, haunting the precincts of slaughter-houses, fish markets, refuse dumps, harbours, and bazaars. Is an expert stunt flier possessing astonishing dash and manoeuvrability on the wing. Will swoop and carry off a dead rat or other titbit lying in

the middle of a congested thoroughfare, turning and twisting with masterly adroitness to avoid the tangle of overhead electric wires and the bustling traffic below. Or one will bide his time and suddenly swoop down from nowhere before the picnicker's sandwich has reached his mouth, whisk it neatly out of his hand and decamp as suddenly as it came! Prefers garbage and offal to sharing large animal carcasses with vultures. Less given to soaring on thermals and circling aloft than vultures, but large rabbles or 'armadas' commonly seen high up, drifting with the wind on motionless wings at sunset. From time to time one individual will suddenly tumble sideways and dive at another, the attacked one turning over on his back, legs and claws outstretched to parry the onslaught, then as soon right himself to resume the sailing, both birds obviously enjoying the game. Has communal roosts in selected trees or groves at which large numbers — sometimes several scores — will flock at dusk and indulge in much wrangling, wing-flapping, and wheeling in the air before settling down for the night.

FOOD. Largely omnivorous. Chiefly offal and garbage in urbanized areas. When feeding nest-young, individuals sometimes become a serious menace to young chickens and ducklings in poultry runs. At this time also given to carrying off golf balls from links. Saunters about to pick up earthworms on watered lawns. Winged termites awkwardly hawked in the air, the insects seized in the talons and head bent down to transfer them to bill. Observed capturing *Rousettus leschenaulti* bats swarming out of a cave on disturbance during daytime; held in talons and torn up with bill in sailing flight. Among stomach contents the following insects have been identified: *Gryllotalpa africana*, *Chrotogonus* sp., *Brachytrypes achatinus*, in addition to remains of mice, lizards, frogs, chickens, and kitchen refuse (Mason & Lefroy 1912).

VOICE and CALLS. Normal call, more heard at commencement of breeding season, a shrill, almost musical whistle *ewe-wir-r-r-r* uttered singly or in quick succession 4 to 7 times from perch as well as on wing. In defence of nest an agitated 'war cry' version of same, *ewe-wi-wirr*, while frantically diving at intruder. During copulation a series of six to ten excited squeals (uttered by female?) rising in crescendo and ending abruptly on completion of act.

BREEDING. Season prolonged, varying with latitude and locality; in the Himalayas March to May; in the Peninsula mainly between September and April; in Ceylon December to May. Nest, an untidy platform of sticks, iron wire, rags, tow, and rubbish of every description. Placed 7 to 14 metres up in a forking trunk, or crotch of branches of large trees — neem (*Melia*), banyan or peepul (*Ficus*), tamarind (*Tamarindus*), shisham (*Dalbergia*), mango (*Mangifera*) or other, commonly near human habitations. Often in the head of a palm (*Cocos* or *Borassus*). Eggs, 2 or 3, rarely 4, broad ovals almost equal at both ends. Very variable in coloration and markings; usually greyish-, greenish-, or pinkish white, with blotches, smears, or freckles of blackish brown, reddish brown, purplish, or blood red. Average size of 200 eggs 52.7×42.7 mm. (Baker). Both sexes participate in nest-building, incubation and nest-feeding. Incubation period unrecorded. To copulate, the male alights directly from the air on the female's back in response to her peculiar squealing invitation, flapping his wings to steady

himself. The length of the pre-incubation copulatory period (in one case 13 September to 21 January and then decreasingly on till 24 February), and the daily frequency of copulation (five to seven times in the early stages) is astonishing. (For details see Sálím Ali 1926, JBNHS 31: 524-6.)

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♂	420-475	32-36	49-58	250-289 mm.
♀ ♀	432-499	—	—	—
				(Baker)

Six recent specimens give:

	Wing	Bill (from skull)	Tarsus	Tail central	outer
3 ♂ ♂	426-452	35.5-38	51 (1)	213-224	246-284 mm.
				Depth of fork	33-63 mm.
3 ♀ ♀	418-458	37-38.5	53 (1)	217-227	244-290 mm.
				Depth of fork	27-42 mm.
					(SA)

COLOURS OF BARE PARTS. Iris brown. Bill black; cere, gape and extreme base of lower mandible yellow or greenish yellow. Legs and feet pale yellow; in young birds greenish yellow. Claws black.

134. **Blackeared or Large Indian Kite.** *Milvus (migrans)¹ lineatus* (Gray)

Haliaeetus lineatus J. E. Gray, 1831, based on collections made by Hardwicke, Ill. Ind. Zool., 1(8): 1, pl. 18 (China)
Baker, FBI No. 1788, Vol. 5: 124

LOCAL NAMES. Same as for No. 133.

SIZE. Pariah Kite, slightly +; length c. 66 cm. (26 in.).

FIELD CHARACTERS. In overhead flight distinguishable from Pariah Kite by larger size and a *conspicuous* white buzzard-like underwing patch (lower wing-coverts) which is only dimly indicated in *govinda*. At rest, larger size and somewhat paler underparts, without rufous tinge, are suggestive pointers. Sexes alike.

STATUS, DISTRIBUTION and HABITAT. Breeds in Ladakh and N. Kashmir, and possibly throughout the Himalayas, between c. 1500 and 4500 m. alt. Observed in Nepal at c. 5330 m. in May and collected at c. 4260 m. in July (Biswas). Breeds also in the higher hill ranges of Assam south of the Brahmaputra (*vide* Baker). Winter visitor in small numbers to W. Pakistan and northern and peninsular India south at least to about lat. 18°N. in the Deccan (Maharashtra, Andhra).

Extralimital. 'Breeds in W. Siberia from about lat. 58°N. east to Transbaikalia and Japan, south to Transcaspia, Turkestan, and N. China. Winters south to N. India, Burma, Indochina, and Hainan' (Peters).

MIGRATION. No ringing data. Frank Ludlow (*Ibis* 1937: 493) witnessed a spectacular migration in Bhutan on 5 September. A continuous stream of

¹ Brackets as used by Stresemann in revised edition of Vol. 1 of Peters's *Checklist*. For explanation see Stresemann, E. (1959): 'Die Gliederung der Schlangennadler-Gattung *Spilornis*' *Vierteljahrsschrift der Naturforschenden Gesellschaft in Zürich*, 104: 208-13.

these kites was coming from the north down the Kuru Chu Gorge to Bhutan, not in dense formation but a long-drawn line of 3 or 4 birds followed at intervals of a hundred metres or so by 3 or 4 more, and so on. Several hundreds of birds must have passed the observer thus during the half-hour he was watching, and the stream was continuing when he left.

GENERAL HABITS etc. Not appreciably different from Pariah Kite's, but both in its residential area and winter quarters more of a mountain bird, less commensal with man and less of a municipal scavenger.

BREEDING. *Season*, in Kashmir March/April; in Ladakh and the Himalayas April/May; in the Assam hills February to early April. In Kashmir Whistler found some nests in mulberry and poplar trees at moderate heights; Osmaston in huge chenars *c.* 20 to 30 metres up. *Nest*, of sticks lined with wool, hair, rags, etc.—not different from Pariah Kite's—perhaps with less sophisticated rubbish admixed than in urban localities. *Eggs*, 2 or 3, like the Pariah's in coloration and with the same range of variations; slightly larger. Average size of 100 eggs 57.3 × 45.2 mm. (Baker). Apparently both sexes share all the domestic chores, though as yet male's share proven only in incubation. Incubation period unrecorded.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♂	475–529	34–37	52–62	288–345 mm.
♀ ♀	480–552	—	—	—
				(Baker)

COLOURS OF BARE PARTS. As in Pariah Kite. Legs and feet sometimes nearly white.

Genus HALIASTUR Selby

Haliastur Selby, 1840, Cat. Gen. Subgen. Types Aves: 2 (note), 3. Type, by original designation, *Haliastur pondicerianus* = *Falco indus* Boddaert

Bill fairly large, compressed, slightly curved near base, sharply so at tip; festoon on cutting edge of upper mandible small but distinct. Nostrils almost round and oblique. Wings very long, extending to or beyond tip of tail; 4th primary (as.) longest; first about equal to two-thirds length of 4th. Tail moderately long, slightly rounded. Tarsi short and feathered above; the naked portion with broad transverse scutes in front and on toes, elsewhere with hexagonal scales, small at sides large behind, where in young birds they form broad scutes; soles furnished with tiny prickly scales; outer toe longer than inner; claws curved, moderately strong.

The genus contains two species found throughout the Oriental and Australian regions, one of which occurs within Indian limits.

135. **Brahminy Kite.** *Haliastur indus indus* (Boddaert)

Falco Indus Boddaert, 1783, Table Pl. enlum. : 25

(Pondicherry *ex* Daubenton, pl. 416 and Buffon 1:490)

Baker, FBI No. 1784, Vol. 5: 118

Plate 11, fig. 6, facing p. 208

LOCAL NAMES. *Brahmini cheel*, *Sankar cheel*, *Dhobia cheel*, *Roo mübdärk* (Hindi); *Shankha cheel* (Bengal); *Kehe* (Santhali); *Khemankari* (Sanskrit); *Gäruda* (Kannada);

Gāruda lawa, *Gāruda manāru* (Telugu); *Sem parundu* (Tamil); *Shemberid* (Yerkali); *Rangu cheelani* (Assam); *Garudan*, *Krishna parundu* (Malayalam); *Pilyo*, *Rutta okāb* (Sind); *Ukussa* (Sinhala).

SIZE. Pariah Kite —; length c. 48 cm. (19 in.).

FIELD CHARACTERS. A handsome rusty red or deep chestnut hawk with white head, neck, upper back, and breast, and brown abdomen. Under aspect of wings in overhead flight greyish with a cinnamon tinge; black at tips (primaries). Sexes alike.

Young (immature). Brown, rather like Pariah Kite but always distinguishable by *rounded* (not forked) tail. Sometimes with whitish patches on underwing, confusingly like buzzard (*Buteo*).

STATUS, DISTRIBUTION AND HABITAT. Resident — with some local seasonal movements governed by monsoon and water conditions — throughout India (up to c. 1800 m. in the Himalayas), both Pakistans (except Baluchistan and N.W.F. Province), Nepal (terai to c. 1400 m. alt.), Ceylon (low country Dry and Wet zones), Andaman Is. Affects well-watered localities inland, and sea coast.

Extralimital. Burma east to S. China, south to Tenasserim, N. Thailand, central Vietnam.

GENERAL HABITS. A water-loving hawk, haunting the vicinity of tidal creeks, fishing villages, docks, and harbours on the seaboard, and dammed reservoirs, rivers, jheels, inundated rice-fields, and flooded areas inland. Occasional pairs become parasitic on man like the Pariah Kite, scavenging about towns and villages far from any large body of water. Of comparatively timid disposition and largely subjected to piracy by kites and crows in seaports. Swoops to pick up in its talons floating jetsam or small fish off the surface, often commencing to demolish them in flight. Has been frequently observed to flop down on the water in the attempt, riding buoyantly even on a choppy sea, and taking off again without effort.

FOOD. Fish (chiefly dead or near the surface, or stranded high and dry by receding flood) including mud-skippers (*Periophthalmus*); frogs, land and strand crabs (*Paratelphusa* spp., *Ocypoda macrocera*), lizards, small snakes, garbage thrown overboard from ships in harbour, winged termites hawked in the air, orthopterous insects fleeing from fired grassland, young chicks of poultry, sickly birds (once *Alcedo atthis*); rarely also carrion in company with vultures. Among stomach contents the following insects have been identified; *Schizodactylus monstrosus*, *Gryllotalpa africana*, *Liogryllus bimaculatus*, *Brachytrypes achatinus*, *Atractomorpha crenulata*, *Chrotogonus* spp., in addition to remains of small birds, mice, frogs and lizards (Mason & Lefroy 1912). One caught a living garfish from surface of water with the action of a sea eagle; another seen attacking a hare (W. F. Sinclair).

VOICE and CALLS. A harsh wheezy squeal. When swooping to drive off intruding crow etc. from proximity of nest, a louder, agitated and bellicose version of the same.

BREEDING. *Season*, over the subcontinent as a whole during the cold weather, between December and March/April, varying locally; in Ceylon December to May. *Nest*, a rough untidy structure c. 30–60 cm. across and up to c. 20 cm. deep, lined with miscellaneous rubbish — wool, rags, bits of skin, tow, etc. — sometimes with green leaves. Placed c. 6 to 15 m. up in

a large banyan or peepul (*Ficus*), tamarind, neem, casuarina, or other tree, or in the head of coconut palm, preferably near water, often within or close to a village; rarely on a ruined building. Eggs, normally 2, sometimes 3, rarely 4, greyish white, feebly speckled and blotched with pale dingy reddish brown — poorly marked replicas of Pariah Kite eggs; variable. Average size of 100 eggs 50.7×40.2 mm. (Baker).

Both sexes share in nest-building, incubation¹, and feeding the young. Incubation period about 26/27 days.

MUSEUM DIAGNOSIS. For details of plumage see Baker, loc. cit.

MEASUREMENTS

	Wing	Bill (from skull)	Tarsus	Tail
♂♂	359–394	34–38	51–59	180–207 mm.
♀♀	379–403	35–38	51–59	189–205 mm. (SA)

COLOURS OF BARE PARTS. Iris brown. Bill bluish horny, culmen and tip paler, sometimes yellowish; cere yellow (bluish in young). Legs and feet dull yellow, greyish yellow, or greenish yellow.

Genus ACCIPITER Brisson

Accipiter Brisson, 1760, Orn., 1: 28, 6: 310. Type, by tautonymy, *Accipiter* Brisson = *Falco nisus* Linnaeus

Astur Lacépède, 1799, Tabl. Ois.: 4. Type, by subsequent designation, Vigors, 1824, *Falco palumbarius* Linnaeus = *F. gentilis* Linnaeus

Bill short, powerful, curving sharply from cere and with a well-pronounced festoon. Nostrils large, oval, horizontal, thinly covered with bristles. Wings short, rounded; 3rd, 4th, or 5th primary (as.) longest, or all three subequal. Tail long, extending beyond wing tips, rather graduated. Tarsus long, thin, unfeathered; scutellated in front and behind, reticulated on sides. Toes powerful; middle toe exceeding the lateral ones in length, greatly so in some species. Claws well curved, unequal; inner claw very large, about equal to that on hind toe.

Genus cosmopolitan; represented by six species within our limits.

Key to the Species

	Page
A Small but distinct nuchal crest.....	<i>A. trivirgatus</i> 240
B No definite crest.....	1
1 Middle toe without claw considerably longer than outer toe with claw	a
Middle toe without claw about as long as outer toe with claw	b
a Black mesial throat-stripe absent; wing ♂ 202–219 mm., ♀ 233–260 mm.....	<i>A. nisus</i> 243
Black mesial throat-stripe generally present; wing ♂ 145–174 mm., ♀ 182–210 mm.....	<i>A. virgatus</i> 246
b Third primary longest.....	<i>A. soloensis</i> 239
Fourth or fifth primary longest.....	I

¹ Male's participation needs confirming. Leslie Brown (personal communication) says: 'Probably only the female incubates, which is fed on the nest by the male.'

		Page
I	Larger; wing ♂ 290–324 mm., ♀ 353–362 mm.....	<i>A. gentilis</i> 233
	Smaller; wing ♂ 168–206 mm., ♀ 180–226 mm.....	
	<i>A. badius</i> 235

136. **Eastern Goshawk.** *Accipiter gentilis schvedowi* (Menzbier)

Astur palumbarius schvedowi Menzbier, 1882, Orn. Geogr. Eur. Russl.: 439
(Transbaikalia)

Baker, FBI No. 1801, Vol. 5: 146

Plate 10, fig. 1, facing p. 192

LOCAL NAMES. *Jarra* ♂, *Baaz* ♀ (Hindi); *Zorres* ♂, *Shāhbāz* ♀ (Sind).

SIZE. Pariah Kite \pm ; length ♂ c. 50 cm. (20 in.), ♀ c. 61 cm. (24 in.).

FIELD CHARACTERS.

Adult. Like a huge Shikra in shape and general aspect, with longish tail and short rounded wings. *Above*, dark grey, darker on crown, nape, sides of head and neck; edge of forehead and supercilium white. *Below*, white, cross-barred with black — narrowly on body, broadly on tail.

In overhead soaring flight the close-barred body and broad rounded wings, and longish fanned tail with 3 (or 4) black bands (subterminal broadest) are suggestive pointers. Sexes alike; female larger.

Young (immature). *Above*, light brown, the feathers edged or tipped buffy white; the markings broader on crown, nape, and hindneck. Tail mottled brown with 4 or 5 broad blackish bands. *Below*, buff or pale rufous, boldly streaked with blackish oval spots or drops; not barred.

STATUS, DISTRIBUTION and HABITAT. Breeds sparingly in the NW. Himalayas above c. 2400 m. altitude; possibly also in high Garhwal and eastward. Chiefly a rare winter visitor to N. India and the lower Himalayas, from Kashmir to Sikkim and Assam. Vagrant in W. Pakistan (Sind, Bahawalpur), and Gujarat (Saurashtra). Affects Himalayan forests of oak (*Quercus*), spruce (*Picea*), silver fir (*Abies*), etc.

Extralimital. Central Asia from Barnaul and Krasnoyarsk to Yakutsk and the Aldan river, south to the Tien Shan and Altai mountains and the Amur river (Peters).

GENERAL HABITS. Like the Shikra and other 'true' hawks (*Accipiter*) and hawk-eagles, hunts from an ambush up in the branches of some thickly foliated tree, pouncing on its prey before it has realized the danger. If unsuccessful will pursue the quarry for distances up to several hundred metres before striking or abandoning the chase. If disturbed in its vigil, drops down from the perch and flies low and fast with rapid wing-beats close to the ground, shooting steeply up into the branches of another tree some distance away. In the High Himalayas above the tree-line uses rocks as look-out posts whence to pounce on snow partridges etc. coming out to feed in open ground. Often seen late morning or early afternoon soaring and circling at great heights, tail partly fanned, wings outspread and motionless.

Highly prized by falconers, and was in great demand when falconry was more popular in W. Pakistan and India. The more powerful female was

trained to strike hares, houbara bustards, ducks, herons, and other large birds. (For methods of catching goshawks in the Punjab see Donald, C. H., 1920, JBNHS 27: 133-4.)

FOOD. Birds and small mammals, such as pheasants, partridges, pigeon and hares.

VOICE and CALLS. Unrecorded in India. Elsewhere a short squeal or scream like a buzzard's, a chattering *giak, giak, giak*, and others have been described.

BREEDING. Possibly nests less rarely in the higher NW. Himalayas than the paucity of records would indicate. According to Baker the only authentic one is Whymper's of a nest containing two young birds in Garhwal in March, though the altitude given as 'under 3000 ft.' (under *c.* 1000 metres) would seem unusual. The only eggs known are two (hard-set) taken by Hume's Indian collector from a nest about 40 ft. up in a deodar tree in 'Bussahir' (Bashahr), *c.* 2700 m. altitude, on 15 April. The female parent was produced with the eggs to confirm identification. They were broad ovals, greyish white, one mottled and spotted with faint brown stains (possibly not natural). They measured '2.2 × 1.78 and 2.1 × 1.7 inches' (= 55.9 × 45.2 and 53.3 × 43.2 mm.) — Baker.

Share of the sexes in nesting activities, incubation period, etc. unrecorded.

MUSEUM DIAGNOSIS. No definite crest. 4th primary (as.) longest. [For detailed description of plumages etc. see Witherby 1939, 3:75-7 for the western (nominate) race which differs only in being slightly larger and paler, with the upperparts more brown less grey.]

MEASUREMENTS Wing ♂♂ 290-323; ♀♀ 353-362 (Baker). An ad. ♂ from Sikkim has wing 324 mm. (Meinertzhagen).

Bill (from feathers) 21-24; tarsus 70-78; tail 210-230 mm. (for *A. g. gentilis* — Witherby).

COLOURS OF BARE PARTS. Iris, varying with age, lemon- or golden yellow to red (in old birds). Bill dark plumbeous slate, paler at base and often yellow at gape; cere yellow, greenish above. Legs and feet yellow; claws black.

ACCIPITER BADIUS (Gmelin)

Key to the Subspecies

		Page
A	Tail of adult with more than one dark subterminal band and of the young with more than three cross-bands of dark hues.....	1
B	Tail of adult with no bars except the subterminal band; young with only three bands.	2
1	Underparts very richly barred with rufous.....	<i>A. b. poliopsis</i> 237
	Underparts less richly barred with rufous; rufous nuchal collar well marked.....	<i>a</i>
a	Paler above	<i>A. b. cenchroides</i> 235
	Darker above.....	<i>I</i>
I	Generally smaller, more grey above.....	<i>A. b. badius</i> 237
	Generally larger, more ashy above.....	<i>A. b. dussumieri</i> 235
2	Breast rufous, wing under 190 mm.....	<i>A. b. butleri</i> 238
	Breast pale grey, wing over 190 mm.	<i>A. b. obsoletus</i> 239

137. Central Asian Shikra. *Accipiter badius cenchroides* (Severtzov)

Astur cenchroides Severtzov, 1873, Bull. Imp. Soc. Friends Nat. Sci., Anthr. and Ethnogr. Moscow, 8 (2): 113 (Auljeata and Chimkent, Russian Turkestan. Restricted to the lower Syr-Darya by Heptner & Stachanov)

Baker, FBI No. 1804, Vol. 5: 150

LOCAL NAMES. *Shikra* ♀, *Chipka* ♂ (Hindi).

SIZE. House Crow —; length ♂ *c.* 31 cm. (12–13 in.), ♀ *c.* 36 cm. (14 in.).

FIELD CHARACTERS. Doubtfully recognizable from Indian Shikra (q.v.); somewhat larger and paler.

Adult also more brown less grey above and with the barring on underparts paler and extending to thigh coverts and vent. Sexes alike; female larger.

Young (immature). As in the Indian form (No. 138).

STATUS, DISTRIBUTION and HABITAT. Resident in W. Pakistan (breeding in Baluchistan, NWF. Province, upper Sind (?)) extending, at least in winter, to lower Sind, Bahawalpur, Punjab, but status here uncertain.

Extralimital. E. Iran, Afghanistan, Russian Turkestan. ('Syr-Darya Valley, W. Tien Shan, Ferghana' — Peters.)

GENERAL HABITS, etc. Same as No. 138.

BREEDING. Recorded in NWF. Province and Baluchistan between March and June. Nest and eggs as in Indian Shikra (q.v.). Average size of 30 eggs 40.4 × 31.3 mm. (Baker).

MUSEUM DIAGNOSIS. In the species *A. badius* the second primary (as.) is longer than sixth. For details of plumages and structure of *A. b. cenchroides* see Hartert 1912–21, Vög. pal. Fauna, 2: 1158–9.

MEASUREMENTS

	Wing	Bill (from cere)	Tarsus	Tail
♂♂	185–197	12–13	45–46	<i>c.</i> 150–160 mm.
♀♀	210–222	—	—	180–192 mm.

Middle toe without claw: ♂ under 30 mm.; ♀ 31–35 mm. (Hartert).

COLOURS OF BARE PARTS. As in No. 138.

138. Indian Shikra. *Accipiter badius dussumieri* (Temminck)

Falco dussumieri Temminck, 1824, Pl. Col. Livr. 52, text to pl. 308 (adult), pl. 336 (immature). (India, type from Bengal)

Baker, FBI No. 1803, Vol. 5: 149

LOCAL NAMES. *Shikra* ♀, *Chipka* or *Cheepāk* ♂ (Hindi and Marathi); *Shikre* (Bengal); *Kuthia* ♂, *Tunna* ♀ (Nepal); *Tingkyi* (Lepcha); *U-cham* (Sikkim).

SIZE. House Crow —; length ♂ *c.* 31, ♀ *c.* 36 cm. (12–14 in.).

FIELD CHARACTERS. A small, short and rounded-winged hawk with a longish multibanded (4 or 5) tail.

Adult. *Above* ashy blue-grey. *Below*, white closely barred with rusty brown, especially on breast. A median grey stripe on throat. Sexes more or less alike; female larger and dark smoky brown washed with grey above.

Difficult to distinguish in the field from migratory Sparrow-Hawk (147) (q.v.), but is somewhat paler in coloration, with stouter legs and shorter toes.

Young (immature). *Above*, dark brown; tail with more bars (5-7). *Below*, white with broad brown vertical streaks and spots.

STATUS, DISTRIBUTION and HABITAT. Resident. Sind (?), West Pakistan, Nepal (dun and Valley), all India excepting Kerala and Assam (where replaced by other races, qq.v.), up to c. 1400 metres altitude in the Himalayas. Affects open wooded biotope, hill and plain, and the environs of villages and cultivation.

GENERAL HABITS. Uses the same surprise tactics in its hunting as the Goshawk, pouncing on unsuspecting quarry from its ambush up in a leafy tree. Sometimes stampedes small birds out of a thicket, selecting one from the flock, chasing it with speed and determination till struck. Normal flight swift, attained by rapid wing-strokes and punctuated with glides, the bird sweeping steeply up to alight on a branch, its progress through the trees often heralded by 'Ware hawk!' alarm-calls of squirrels and small birds. Much given to soaring on thermals and circling high up in the heavens, particularly during breeding season when also a pair will indulge in noisy and spectacular aerobatics, spiralling upwards, tumbling, and stooping at each other. At times during this season assumes a peculiar hovering flight: wings slightly bent and held above level of back, and flapped very slowly and deliberately. Possesses great pluck and dash; in heyday of falconry was commonly trained to strike quails, partridges, and crows, and even such large birds as young peafowl.

FOOD. All living animals of manageable size recorded: mammals (field rats and mice, striped squirrels), birds (sparrow, myna, babbler, quail, dove, black and racket-tailed drongo), lizards (*Calotes versicolor*, *Mabuya carinata*, *Hemidactylus* sp., *Lygosoma* sp.), frogs, locusts, grasshoppers, mantises, dragonflies, flying termites, etc. The following insects specifically identified among stomach contents: *Chrotogonus* sp., *Gryllodes melanocephalus*, *Schizodactylus monstrosus*, *Gryllotalpa africana*, *Brachytrypes achatinus*, and geometrid caterpillars (Mason & Lefroy 1912). Individuals often become confirmed chicken-lifters and then a serious menace to poultry-keepers.

VOICE and CALLS. Normal calls a loud, harsh, and challenging, *titu-titu* very like black drongo's, and long-drawn screams rendered by G. M. Henry as *iheeya*, *iheeya*, etc. During breeding season, in the aerial courtship display as well as when perched, a noisy sharp double note *ti-tui* constantly repeated.

BREEDING. *Season*, overall March to June, varying locally in different parts of the country; perhaps April and May most general. *Nest*, untidy crow-like structure of twigs lined with grass and roots, c. 30 cm. across and c. 10 cm. deep. Placed 7 to 15 metres up in a leafy mango, neem, tamarind, or other tree, or at the base of leaf stalks in a palmyra (*Borassus*) palm. *Eggs*, 3 or 4, rarely 5, pale bluish grey, sometimes finely stippled with blackish at the larger end, and blotched with pale grey or lavender. Average size of 100 eggs 38.8 × 31.1 mm. (Baker). Both sexes share nest-building (twigs carried in feet) and feeding the young. Male's part in incubation uncertain. Incubation period 18-21 days.

MUSEUM DIAGNOSIS. Smaller and purer grey on upperparts than *A. b. cenchroides*; larger and more ashy above than *A. b. badius*, with the rufous barring below paler.

But all races subject to great individual variation; their gradual and complete intergradation precludes fixing of definite racial boundaries.

MEASUREMENTS

	Wing	Bill (from skull)	Tarsus	Tail
♂ ♂	176-206	18-21	50-54	137-166 mm.
♀ ♀	200-222	21-23	51-55	160-175 mm.
				(SA)

COLOURS OF BARE PARTS. Iris golden- or orange-yellow. Bill slaty blue, black at tip, paler at base, yellowish on gape; cere bright yellow to deep orange. Legs and feet yellow; claws black.

139. **Ceylon Shikra.** *Accipiter badius badius* (Gmelin)

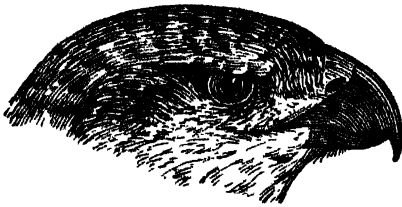
Falco badius Gmelin, 1788, Syst. Nat., 1(1): 280 (Ceylon)

Baker, FBI No. 1802, Vol. 5: 147

LOCAL NAMES. *Kobeyi ukussa*, *Kurulla goya* (Sinhala); *Prappidian*, *Shikra* (Malayalam); *Jali dega* (Telugu); *Vulluru* (Tamil).

SIZE. House Crow —; length c. 30-34 cm. (c. 12-13 in.).

FIELD CHARACTERS. Slightly smaller than Indian Shikra (q.v.), with upperparts more grey, less ashy. Female and immature as in above.



× c. 1

STATUS, DISTRIBUTION and HABITAT. Resident. Ceylon (common in all zones up to c. 1800 m.); Kerala (low country and up to at least c. 1500 m. elevation). Affects open deciduous biotope. Groves near villages etc.

GENERAL HABITS etc. Same as Indian Shikra.

BREEDING. *Season*, January to April/May. *Nest and Eggs* as in the Indian form. Average size of 18 eggs 39.0 × 31.8 mm. (Baker).

MUSEUM DIAGNOSIS. Smaller and distinctly darker above than ♂ *A. b. dussumieri*; closer barred with darker rufous below, leaving only narrow white lines between the bars. Kerala birds largely intermediate between Indian and Ceylonese races.

MEASUREMENTS

	Wing	Bill (from skull)	Tarsus	Tail
♂ ♂	170-182	19-21	c. 50-54	128-134 mm.
♀ ♀	186-206	22-23	—	145-161 mm.
				(SA)

COLOURS OF BARE PARTS. As in the Indian form.

140. **Burmese Shikra.** *Accipiter badius poliopsis* (Hume)

Micronisus poliopsis Hume, 1874, Stray Feathers, 2: 325 (Northern Pegu)

Baker, FBI No. 1805, Vol. 5: 151

Plate 11, fig. 8, facing p. 208

LOCAL NAME. *Shikra sorai* (Assam).

SIZE. House Crow —; length ♂ *c.* 31 cm., ♀ *c.* 36 cm. (12–14 in.).

FIELD CHARACTERS. Like Indian Shikra (q.v.) but darker.

STATUS, DISTRIBUTION and HABITAT. Resident. Assam (plains and hills to *c.* 900 m. altitude).

Extralimital. Burma, Thailand, Malay Peninsula, east through the Indochinese countries to Hainan and Formosa.

GENERAL HABITS etc. As in Indian Shikra.

BREEDING. *Season*, April–May. *Nest and Eggs*, as in the Indian form. Average size of 28 eggs 39.0 × 31.8 mm. (Baker).

MUSEUM DIAGNOSIS. As dark as the Ceylon race above, with crown and sides of head a purer grey. Underparts much more richly and broadly barred with rufous than any other race. Female and immature differ from adult in same way as in other races.

MEASUREMENTS

	Wing	Bill
		(from feathers)
♂ ♂	186–203	19–21 mm.
♀ ♀	221–226	20–22 mm.
		(Baker)

COLOURS OF BARE PARTS. As in the Indian form.

141. **Car Nicobar Shikra.** *Accipiter badius butleri* (Gurney)

Astur butleri Gurney, 1898, Bull. Brit. Orn. Cl., 7: 27 (Car Nicobar Island)
Baker, FBI No. 1806, Vol. 5: 151

LOCAL NAME. *Kadva* (Car Nicobar).

SIZE. House Crow —; length ♀ *c.* 30 cm. (12 in.).

FIELD CHARACTERS.

Male (adult). Like Indian Shikra (q.v.), but very small and much more richly coloured, and with only a single subterminal black band in tail.

Female and Young (immature). Much more rufous-chestnut and richly coloured everywhere than other races. 'Young birds on the wing looking as red as, or redder than kestrels' (Butler, A. L., 1899, JBNHS 12: 686).

STATUS, DISTRIBUTION and HABITAT. Resident (endemic?). So far known only from Car Nicobar, Nicobar Islands. Camorta (?).

GENERAL HABITS etc. Nothing specifically recorded except that 'young birds have a trick of fluttering on a bough exactly like a broken-legged bird, probably a trick practised when they are just out of the nest to first catch the eye of the old bird bringing food' (Butler, loc. cit.).

BREEDING. Unknown. Butler found a nest (February?) just completed and apparently about to be laid in, *c.* 13 metres up at the end of a horizontal *Ficus* branch.

MUSEUM DIAGNOSIS. Male bright grey above, brightest on crown and sides of head and neck; the latter without reddish flecking on sides. Chin greyish cream with median stripe obsolete. Inner webs of primaries unbarred; under wing-coverts

pure white. 5th primary (as.) equal to or somewhat longer than 4th (*contra* other races). — Hartert.

MEASUREMENTS

	Wing	Bill (from gape)	Tarsus	Tail
2 ♂♂	168, 178	22, 22	45 (1)	140 (1) mm. (Butler)
♀	180	—	43	152 mm. (Baker)

COLOURS OF BARE PARTS. Iris bright orange. Bill pale bluish horny; tip dusky; cere pale greenish. Feet yellow (Butler). Bill bright bluish (Hartert).

142. **Katchal Shikra.** *Accipiter badius obsoletus* (Richmond)

Astur obsoletus Richmond, 1902, Proc. U.S. Nat. Mus., 25: 306 (Katchal Island)
Baker, FBI No. 1807, Vol. 5: 152

LOCAL NAMES. Unrecorded.

SIZE. House Crow —; length *c.* 33–34 cm. (*c.* 13–14 in.).

FIELD CHARACTERS. Richly coloured above like *A. b. butleri*, also with a single subterminal black band in tail. Somewhat larger.

STATUS, DISTRIBUTION and HABITAT. Resident (endemic ?). So far known only from Katchal Island, Nicobars.

GENERAL HABITS etc. Unrecorded.

BREEDING. Unrecorded.

MUSEUM DIAGNOSIS. Differs from *A. b. butleri* in being paler on nape and sides of head; also in the indistinct white superciliary line, and white lores and throat. Underparts resembling *A. b. butleri* in pattern but the reddish colour on breast almost entirely absent (Richmond).

MEASUREMENTS. Wing 192; culmen 21.5; tarsus 52; tail 157 mm. (Abbott).

COLOURS OF BARE PARTS. Iris dark crimson; eyelids greenish. Bill blackish at tip, horn-blue at base; cere greenish. Feet yellow (Abbott).

143. **Horsfield's or Chinese Goshawk.** *Accipiter soloensis* (Horsfield)

Falco Soloensis Horsfield, 1821, Trans. Linn. Soc. London, 13: 137 (Java)
Baker, FBI No. 1808, Vol. 5: 153

LOCAL NAMES. Unrecorded.

SIZE. House Crow —; length *c.* 30 cm. (*c.* 12 in.).

FIELD CHARACTERS.

Adult. Like the Shikra but slaty to ashy black above, with sides of head and neck ashy grey; throat buffy white streaked with grey. Scapulars and tertiaries with broad white bars or patches. *Below*, breast and flanks variably tinged with vinous or pale ferruginous, paling to white on abdomen and vent.

In overhead flight reddish breast, barred tail, and buff lining to broad rounded wings suggestive. Orange cere prominent.

Young (immature). Resembles immature *A. badius* but is darker above, especially on head (brownish slate), with broadly streaked or spotted underparts, and rufous-barred flanks.

STATUS, DISTRIBUTION and HABITAT. Uncertain. 'Common' (winter ?) on Katchal I. and the Great and Little Nicobar Is. (Abbott & Boden Kloss). Andaman Is.

Extralimital. 'Breeds from N. China and Korea south to Kwangtung and Formosa (?). In winter to the Malay Peninsula and the East Indies to Waigu' (Peters). Stragglers reaching E. Burma and N. Thailand.

GENERAL HABITS. Very little known. Apparently a shy forest-dweller.

MUSEUM DIAGNOSIS. 3rd primary (as.) longest; 4th almost subequal; both notched on outer webs. 2nd primary about equal to 5th. Cere orange; bright yellow even in museum skins.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	175-196	17-19	c. 39-44	120-139 mm. (once 147) (Baker)

♂ ♀ Wing 180-202; tail 128-145; middle toe without claw 24-27 mm. (Hartert).

COLOURS OF BARE PARTS. Iris dark brown, pale yellow, or straw colour; eyelids yellow. Bill horny plumbeous, black at tip, yellowish at gape; cere orange or bright yellow. Legs and feet orange-yellow.

ACCIPITER TRIVIRGATUS (Temminck)

Key to the Subspecies

		Page
A	Large; wing ♂ c. 229 mm., ♀ c. 254-260 mm. <i>A. t. indicus</i>	240
B	Medium; wing ♂ c. 196-208 mm., ♀ c. 214-237 mm. ... <i>A. t. peninsulae</i>	242
C	Small; wing ♂ c. 183-184 mm., ♀ c. 198-206 mm. <i>A. t. layardi</i>	242

144. North Indian Crested Goshawk. *Accipiter trivirgatus indicus* (Hodgson)

Astur indicus Hodgson, 1836, Bengal Sporting Mag., 8: 177 (Nepal)

Baker, FBI No. 1810, Vol. 5: 155 (= *A. t. ruftinectus*)

Plate 12, fig. 2, facing p. 224

LOCAL NAMES. *Churiari*, *Jamal kanthi*, *Jurye* (Nepal); *Hagrani daoling* (Cachar).

SIZE. House Crow +; length c. 40-46 cm. (16-18 in.).

FIELD CHARACTERS. A medium-sized short-winged hawk. *Above*, dark brown with forehead, crown, and small nuchal crest blackish grey. Tail with four visible dark brown bars. *Below*, white, broadly streaked on breast and barred on rest of underparts with rich rufous-brown. Throat and under tail-coverts pure white, the former with a conspicuous blackish mesial stripe from chin to breast. Sexes more or less alike; female larger. On casual observation could be mistaken for *Aviceda jerdoni* (No. 125, q.v.). Coloration rather similar and both also crested.

Young (immature). *Above*, brown; head and nape feathers edged with pale rufous; a broad fulvous supercilium. *Below*, buffy white or pale rufous

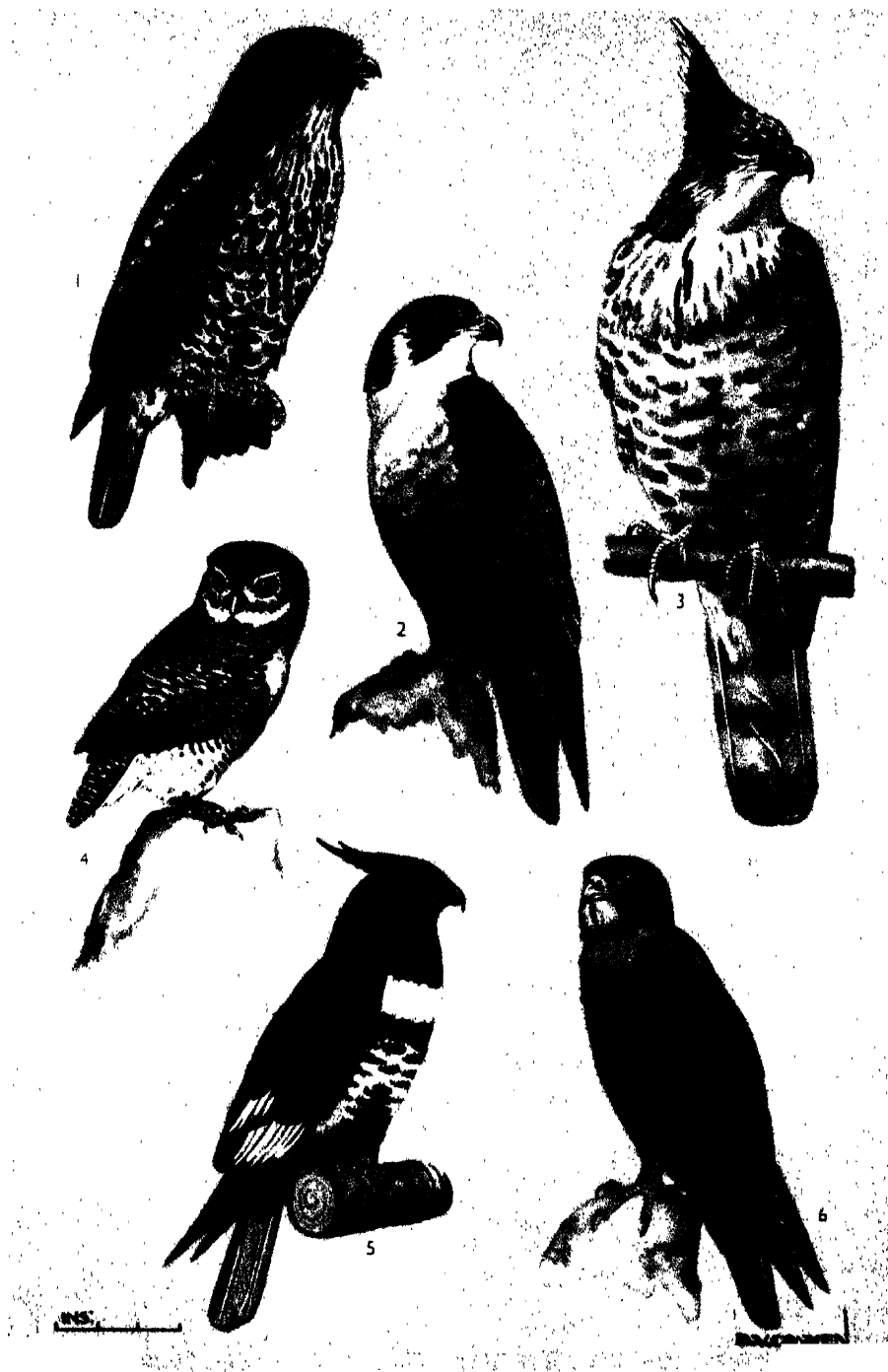


PLATE 13

1 *Ninox s. hirsuta*, Brown Hawk-Owl (644). 2 *Falco p. peregrinator*, Shaheen Falcon (211). 3 *Aviceda j. ceylonensis*, Legge's Baza (126). 4 *Glaucidium r. malabaricum*, Jungle Owl (637). 5 *Aviceda l. leuphotes*, Indian Blackcrested Baza (127). 6 *Falco s. rufipedoides*, Indian Hobby (214).

with blackish mesial throat-stripe and broad streaks or drops on breast and sides of body. Thighs variably barred brown and buff.

STATUS, DISTRIBUTION and HABITAT. Resident. Northern India from Garhwal through Nepal, Sikkim, and Bhutan (?) (terai to c. 2000 m. altitude in the Himalayas) to E. and S. Assam, East Pakistan (?) (foothills and up to c. 1500 m.); south to the Godavari river. Affects fairly open deciduous and semi-evergreen forest.

Extralimal. '... Yunnan and Formosa, south to Burma [Thailand, Malay Peninsula] and Indochinese countries' (Peters).

GENERAL HABITS. A forest-dwelling hawk, otherwise of very similar habits to the Shikra, q.v. Employs the same tactics of Surprise in its hunting, pouncing on prey from a concealed perch up in a leafy tree overlooking a clearing. Sedentary and parochial; often seen in the same patch of jungle day after day. Also much given to circling high above forest in the characteristic manner of the genus — a few rapid wing-beats to spiral gradually upwards, followed by sailing and soaring.

FOOD. Chiefly small mammals, and birds. Green pigeons, wood partridges, and larger game birds such as junglefowl and pheasants recorded.

VOICE and CALLS. Described as 'a shrill prolonged yelp', 'a hoarse chuckling note', and loud screams and deep croaks as it swoops to attack nest-robbers.

BREEDING. *Season*, March through May. *Nest*, a massive structure of sticks, c. 50 cm. across and up to some 30 cm. deep, lined with leaves. Placed c. 9 to 13 metres up in a densely foliated tree standing in a ravine or broken foothills country. *Eggs*, 2 or 3, bluish white with a fine, smooth texture, usually without markings though often stained. Average size of 20 eggs 48.4 × 39.6 mm. (Baker). Share of the sexes in the domestic chores, and incubation period, unrecorded. The birds are bold and truculent in defence of nest.

MUSEUM DIAGNOSIS. In the species *A. trivirgatus* 4th primary (as.) longest; 5th subequal. 6th primary longer than 2nd (*contra* in *A. badius*). Adult male *A. t. indicus* differs from nominate *trivirgatus* of Sumatra in larger size, darker upperparts with blackish crown and short crest. Breast shield brownish rufous, rather extensive; barring of abdomen narrow and rather rufous; thighs strongly barred; under wing-coverts heavily marked. Adult female darker above and lighter below than *peninsulae* (No. 145). Crown very blackish. Striping and barring of underparts reduced; no pronounced breast shield developed because brown stripes on breast rather narrow; bars on abdomen and flanks brownish and rather faded (Mayr, E., 1949 *Amer. Mus. Novitates*, No. 1415).

MEASUREMENTS (North Indian specimens)

	Wing	Tail
2 ♂♂ (ad.)	229.5	188–195 mm.
3 ♀♀ (ad.)	245–260	200–213 mm.
1 ♂ (imm.)	219	180 mm.

(Mayr)

COLOURS OF BARE PARTS. Iris golden yellow (brown in young); eyelids greenish yellow. Bill horny brown or plumbeous horny; culmen and tip blackish; gape yellowish; cere greenish yellow. Legs and feet dull pale yellow to fairly bright dark yellow; claws blackish horny (Baker).

145. **South Indian Crested Goshawk.** *Accipiter trivirgatus peninsulæ*
Koelz

Accipiter trivirgatus peninsulæ Koelz, 1949, Auk, 66: 83

(Londa, Bombay district, peninsular India)

Baker, FBI No. 1809, Vol. 5: 154 (= *A. t. trivirgatus* in part)

LOCAL NAMES. *Gôr besra*, *Manik besra*, *Kôleswar* (Hindi); *Kôkila dega* (Telugu).

SIZE. House Crow —; length *c.* 31–36 cm. (*c.* 12–14 in.).

FIELD CHARACTERS. A medium-sized short-winged hawk.

Adult and Young like No. 144, slightly smaller, but not distinguishable from it in the field. Sexes more or less alike; female larger.

STATUS, DISTRIBUTION and HABITAT. Resident. SW. India from about Goa and N. Mysore (*c.* lat. 16°N.) south through Kerala. The species has not been recorded east of the W. Ghats strip in this section.¹ Affects moist deciduous and evergreen forested foothills and broken country and up to at least *c.* 1100 metres elevation in the Western Ghats system and Nilgiri Hills.

GENERAL HABITS etc. As in 144.

BREEDING. *Season, nest, and eggs*, as in 144, the last somewhat smaller. Average size of 24 eggs (from SW. India including those from Ceylon) 46.7 × 37.1 mm. (Baker).

MUSEUM DIAGNOSIS. Very similar to 144, but slightly smaller. Markings on breast, flanks, and upper abdomen in adult give the impression of a brown breast with the feathers edged white, *contra* Ceylonese race *q.v.* For additional details see Mayr, loc. cit.

MEASUREMENTS. (SW. Indian specimens)

	Wing	Bill (from skull)	Tail
6 ♂♂ (ad.)	196–208	26–28	159–168 mm.
6 ♀♀ (ad.)	214–237	<i>c.</i> 29–31	169–180 mm.

(Whistler)

Wing 1 ♂ (imm.) 211; 2 ♀♀ (imm.) 228–230 mm. (Mayr)

Tarsus *c.* 51–57 mm. (Baker)

COLOURS OF BARE PARTS. As in 144.

146. **Ceylon Crested Goshawk.** *Accipiter trivirgatus layardi* (Whistler & Kinnear)

Astur trivirgatus layardi Whistler & Kinnear, 1936, Jour. Bom. nat. Hist. Soc., 38: 434
(Gillymally, Peak Forest, Ceylon)

Baker, FBI No. 1809, Vol. 5: 154 (= *A. t. trivirgatus* part)

LOCAL NAMES. *Ukussa*, *Kurulla goya* (Sinhala); *Valluru* (Tamil).

SIZE. House Crow —; Ceylon Shikra ±; length *c.* 30–34 cm. (*c.* 12–13 in.).

¹ The distribution given by Mayr (loc. cit.), presumably based in part on FBI 5: 154, as 'Southern India approximately south of a line from Bombay to the mouth of the Krishna river' is not quite correct. In *Nidification* (4: 107) Baker attributes 'Khandesh' to Davidson; the latter does not mention this species at all in his Khandesh list (SF, vol. 10)!

FIELD CHARACTERS. A medium-sized short-winged hawk.

Adults and Young like No. 144, but smaller even than 145. May be distinguished from Ceylon Shikra, of about same size, by pointed crest and boldly black-barred thigh coverts; in overhead flight by chequered pattern on the wing quills. Sexes more or less alike; female larger.

STATUS, DISTRIBUTION and HABITAT. Endemic in Ceylon. Resident, subject to certain seasonal movements. Affects forested areas in all zones, particularly in the hills and Wet Zone, to at least *c.* 1800 m. altitude.

GENERAL HABITS. As in 144.

FOOD. Mainly lizards, small birds, etc.

VOICE and CALLS. A shrill scream *he, he, hehehe* (Henry).

BREEDING. *Season*, February to July. *Nest and eggs* as in 145. Incubation period about 34 days (Phillips).

MUSEUM DIAGNOSIS. Small size the chief diagnostic character. Very similar to 144 and 145, but smaller even than the latter. Markings on breast, flanks and upper abdomen in adults much deeper more chocolate-brown, smaller and pear-shaped giving the impression of a white breast spotted with dark brown, *contra* peninsular Indian race, q.v. But see also Mayr, loc. cit.

MEASUREMENTS

	Wing	Bill (from skull)	Tarsus	Tail
2 ♂♂ (ad.)	183-184	24-26	—	150-152 mm.
6 ♀♀ (ad.)	198-206	27-28	50-53 (2)	157-168 mm. (Whistler)

COLOURS OF BARE PARTS. As in 144.

ACCIPITER NISUS (Linnaeus)

Key to the Subspecies

Much paler	<i>A. n. nisosimilis</i>
Much darker	<i>A. n. melaschistos</i>

147. Asiatic Sparrow-Hawk. *Accipiter nisus nisosimilis* (Tickell)

Falco Nisosimilis Tickell, 1833, Jour. Asiat. Soc. Bengal, 2: 571

(Marcha, Borabhum, India)

Baker, FBI No. 1811, Vol. 5: 156

LOCAL NAMES. *Bāsha* ♀, *Bāshin* ♂ (Hindi); *Warnapa dega* (Telugu); *Prappidian* (Malayalam); *Tanki* (Lepcha); *Uchum* (Sikkim).

SIZE. House Crow —; Shikra ±. Length *c.* 31-36 cm. (12-14 in.).

FIELD CHARACTERS. A medium-sized short-winged hawk.

Male (adult). Very like Shikra; somewhat longer in body but doubtfully distinguishable from it in the field by its darker, slatier upperparts (almost blackish on head), more barred tail-feathers, and only on a close and unobstructed view by its longer, slenderer legs. A white supercilium. Throat without black mesial line. Four or five blackish bands in tail.

Female (adult). Much larger than male, otherwise rather similar; more brown, less pure grey above; paler below.

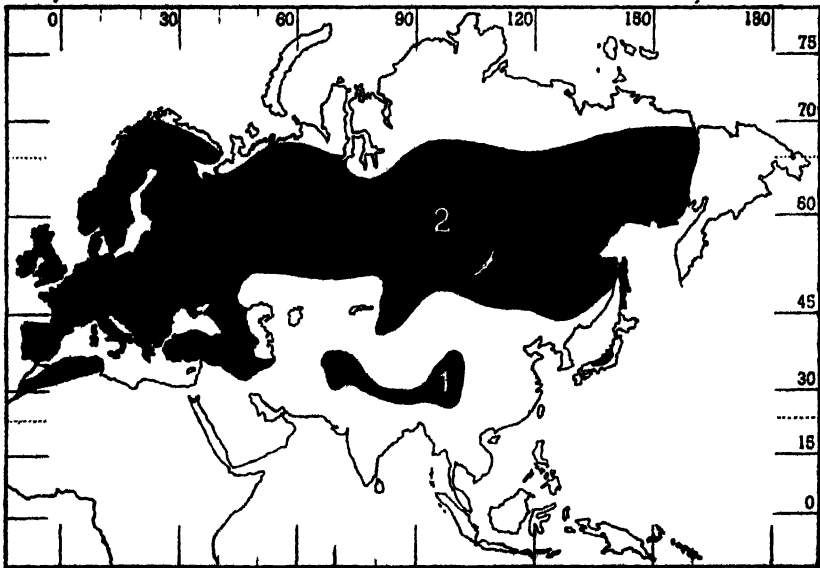
Young (immature). *Above*, dark brown, the feathers edged with rufous. White bases to feathers of nape and neck conspicuous. Tail with five bars. *Below*, breast with heart-shaped rufous-brown spots, turning to bars on abdomen, flanks and thigh-coverts.

STATUS, DISTRIBUTION and HABITAT. Rather sparse winter visitor (September/October to March). All India from c. 2400 m. alt. in Kashmir and along Himalayas, south to Kerala; both Pakistans, Nepal, Andaman Is. Not Ceylon. Affects well wooded, preferably broken and foothills country — light forest, groves, orchards, etc.

Extralimital. 'Breeds in N. and C. Asia from Turkestan to the Sea of Okhotsk, Japan, N. China, and E. China south to the Yangtse. Winters to India, Burma, and S. China' (Peters).

MIGRATION. No precise data.

Accipiter nisus



■ Breeding range 1 *A. n. melaschistos*; 2 *A. n. nisosimilis* and other races

GENERAL HABITS. Usually solitary. When disturbed, drops from a branch, flies very low and flat along the ground, shooting up almost vertically to alight in another tree. Method of hunting as of the genus — by Surprise tactics. Either pounces on quarry from an ambush up in a leafy tree or cruises at great speed close along the ground with rapid wing-beats and glides, 'hedge-hopping' to stampede little birds resting within a hedge-row or bush or feeding unsuspectingly on the ground, getting a flying start on any that panic and dash out and striking in its stride, sometimes almost turning on its back to seize the quarry from underneath. Turns and twists skilfully in pursuit to avoid tree-trunks and other obstacles. The victim is carried off some distance and usually eaten on the ground, held underfoot and dismembered by upward pulls of the hooked bill. Often soars and

circles aloft like Shikra. The female (*basha*) is a favourite with falconers, and trained to strike hares and birds much larger and heavier than itself.

FOOD. Chiefly birds: quails, partridges, and doves, and others normally up to about its own size and weight. Individual birds sometimes become 'habitual offenders' and a serious menace to poultry keepers, carrying off chickens and ducklings.

VOICE and CALLS. Quite different to Shikra's; two long notes followed by three or four very short ones repeated quickly, something like *tiu-tiu-titi* (Donald).

BREEDING. Extralimital, except perhaps in Gilgit. See next.

MUSEUM DIAGNOSIS. In the hand the very slender tarsus and long thin middle toe readily distinguish it from Shikra. For details of plumage etc. see Baker, loc. cit. Also Witherby 1939, 3: 82-4 for nominate *A. n. nisus* which is somewhat smaller and darker, but less dark than No. 148.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	204-216	16-17	c. 55-59	150-161 mm.
♀♀	233-257	18-19	c. 60-65	175-207 mm.
				(SA, Baker)

Middle toe without claw ♂ 35-36 mm.; ♀ over 40 mm. (for *A. n. nisus* — Hartert).

Weight 7♂♂ 5-5.3 oz. (c. 142-147 gm.); 7♀♀ 7.9-5 oz. (c. 198-270 gm.) — Scully.

COLOURS OF BARE PARTS. Iris: adult golden yellow or orange; immature pale yellow. Bill slaty blue with black tip; cere yellow. Legs and feet yellow; claws black.

148. Indian Sparrow-Hawk. *Accipiter nisus melaschistos* Hume

Accipiter Melaschistos Hume, 1869, Rough Notes, March: 128

(Interior of the Himalayas)

Baker, FBI No. 1812, Vol. 5: 158

Plate 10, fig. 2, facing p. 192

LOCAL NAMES. *Bāsha* ♀, *Bāshin* ♂ (Hindi).

SIZE. House Crow —; Shikra ±. Length c. 31-36 cm. (12-14 in.).

FIELD CHARACTERS. A medium-sized short-winged hawk. Very like 147 but markedly darker slate above, and much more rufous below, especially male. Not always distinguishable with certainty from 147 or from Shikra.

STATUS, DISTRIBUTION and HABITAT. Resident (breeding) Baluchistan, NW. Himalayas, Kashmir and eastward along the entire range through Nepal, Sikkim and Bhutan to E. Assam from c. 1400 to 3500 metres altitude. Observed in E. Nepal in spring and summer as high as between c. 3960 and 4570 m. alt. (Biswas). Descends in winter to the foothills and plains at their base, but winter range indeterminate owing to possible confusion in sight records with the immigrant *nisosimilis*. Affects forest and well-wooded country.

Extralimital. 'Breeds from Kashmir east to the Minshan Range, south to the Himalayas and Upper Burma' (Peters).

GENERAL HABITS, FOOD and VOICE. No difference from 147 recorded. In Baluchistan Ticehurst found its chief prey to be the bunting *Emberiza stewarti*.

BREEDING. *Season*, April to June. *Nest*, a stick platform in a tree, commonly a disused nest of a Himalayan Jungle Crow or other bird; sometimes self-built on ledges of cliffs. *Eggs*, 4 to 6 — normally 4 — roundish ovals, buffy reddish white or bluish white, spotted and blotched with reddish brown or blackish brown, with secondary markings of pale reddish or lavender-grey. Average size of 60 eggs 39.1×32.6 mm. (Baker). Both sexes take part in nest construction, but apparently the female alone incubates, though the male assists in foraging for the young. Incubation period not ascertained; estimated by Baker as 30 to 31 days. Normally said not to use a nest for more than one season. Birds very noisy when nesting.

MUSEUM DIAGNOSIS. Much darker and slatier than *A. n. nisosimilis*, the white tips of the nape feathers in male very broad. Underparts of adult male strongly rust-red; of adult female also redder.

MEASUREMENTS

	Wing	Bill (from feathers)
♂ ♂	202-219	c. 16-17 mm.
♀ ♀	242-260	c. 19-21 mm.

COLOURS OF RARE PARTS. As in 147.

ACCIPITER VIRGATUS (Temminck)

Key to the Subspecies

	Page
A Throat with narrow, sometimes indistinct, mesial line. <i>A. v. gularis</i>	250
B Throat with broad black mesial line. 1	
1 Smaller; wing ♂ c. 145-166 mm., ♀ c. 182-189 mm. <i>A. v. besra</i>	249
Larger; wing ♂ c. 165-174 mm., ♀ c. 199-210 mm. a	
a Paler; upperparts dove grey, underparts paler	
. <i>A. v. kashmiriensis</i>	246
Darker; upperparts sooty grey, underparts rufous. <i>A. v. affinis</i>	247

149. West Himalayan Besra Sparrow-Hawk. *Accipiter virgatus kashmiriensis* Whistler & Kinnear

Accipiter virgatus kashmiriensis Whistler & Kinnear, 1936, Jour. Bom. nat. Hist.

Soc., 38: 435 (Murree)

Not in Baker, FBI

LOCAL NAMES. *Besra* ♀, *Dhooti* ♂, *Khand besra* (Hindi).

SIZE. House Crow —; Shikra ±. Length c. 31-36 cm. (c. 12-14 in.).

FIELD CHARACTERS. A medium-sized short-winged Shikra-like hawk with a bold black mesial stripe on throat (*contra* narrow and grey in Shikra; absent in Sparrow-Hawk). May be confused with both Shikra and Sparrow-Hawk, but its broad black throat-stripe and predominantly forest habitat will serve as pointers. Indistinguishable in the field from *A. v. affinis* (No. 150) q.v. (See Museum Diagnosis below.)

STATUS, DISTRIBUTION and HABITAT. Resident in Kashmir, Himachal Pradesh and Garhwal up to c. 3000 m. altitude, descending in winter to the foothills and adjacent plains in the Punjab and Uttar Pradesh. East to Nepal, but precise boundary between eastern and western forms undefinable. Affects broken forested country.

GENERAL HABITS, FOOD, etc. As in No. 150.

VOICE and CALLS. Unrecorded.

BREEDING has been recorded between c. 1000 and 2000 m. elevation in Kashmir (Lolab valley), U.P. [(Kumaon, Dehra Dun dist. (Mussooree), Nainital dist. (Bhim Tal)], Himachal Pradesh (Simla dist.). *Nest and Eggs* as in 150.

MUSEUM DIAGNOSIS. Differs from *A. v. affinis* as follows:

Male (adult). Upperparts definitely paler with more of a dove-grey tint as opposed to sooty grey. Underparts slightly paler.

Young (immature) male: Upperparts markedly paler both as regards the brown colour of the feathers and the rufous edges to them. Pale area of hindneck white as opposed to rich rufous. Underparts much paler, lacking the rich rufous wash on the throat and breast found in eastern birds.

Female (adult and immature) cannot individually be separated, but in a series western birds are slightly paler (Whistler, loc. cit.).

MEASUREMENTS

	Wing	Bill (from skull)	Tarsus	Tail
5 ♂♂ (ad.)	165-167	18	49.5-53	127.5-130 mm.
5 ♀♀ (ad.)	196-207	21.5-23	55-58.5	153-160 mm. (Whistler)

COLOURS OF BARE PARTS. As in 150.

150. East Himalayan Besra Sparrow-Hawk. *Accipiter virgatus affinis* Hodgson

Accipiter affinis Hodgson, 1836, Bengal Sporting Mag., n.s., 8: 179 (Nepal)
Baker, FBI No. 1814, Vol. 5: 161

LOCAL NAMES. Same as for 149.

SIZE. House Crow —; Shikra \pm . Length c. 31-36 cm. (c. 12-14 in.).

FIELD CHARACTERS. A medium-sized short-winged hawk very like Shikra but with a conspicuous black mesial stripe on throat in both sexes, adult and young.

Male (adult). *Above*, blackish slaty grey, the white bases of nape feathers usually showing through. Tail square-ended, grey, with three (or four) blackish bands visible. *Below*, chin and throat white with a conspicuous broad blackish mesial stripe and two faint moustachial streaks. Upper breast and flanks rufous; lower breast and abdomen sometimes barred with same.

Female (adult). *Above*, dark chocolate-brown turning to slaty black on crown and nape. *Below*, as in male.

Young (immature). *Above*, dark brown with edges of feathers rich rufous. *Below*, white broadly streaked with brown on breast and abdomen and barred on flanks. Sometimes five blackish cross-bars on tail.

May be distinguished from Shikra and Sparrow-Hawk by its predominantly forest habitat and, on a good view, by the bold black mesial throat-stripe (narrow and grey in Shikra; absent in Sparrow-Hawk).

STATUS, DISTRIBUTION and HABITAT. Resident (breeding) Nepal and eastward along the Himalayas to the Assam hills north and south of Brahmaputra river, and Manipur (and East Pakistan ?), between 1000 and 2000 m. elevation. Descending in winter to the foothills and adjacent plains. Affects broken forested country.

Extralimital. Breeds also in the hills of W. China, Yunnan, and N. Burma. Winters south to S. China (including Hainan and Taiwan), Burma, Thailand, and the Indochinese countries.

GENERAL HABITS. Very similar to those of Shikra and Sparrow-Hawk of which, in effect, it is the ecological counterpart in heavily forested tracts. Often seen perched on tall dead trees on the verge of evergreen jungle; flight before alighting reminiscent of a dove (A. E. Jones). Very quick on the wing in pursuit of prey, turning and twisting to dodge obstacles with greatadroitness. Baker records one capturing a palm swift (*Cypsiurus*).

In winter keeps to opener, less wooded country in the plains with groves of trees etc. and there most liable to be confused with Shikra.

FOOD. Chiefly small birds, of which the following recorded: barbets, bulbuls, thrushes, sparrows, tits, warblers. Baker found remains of small flying squirrels, mice and bats in addition to birds under its nests. Also takes lizards and insects. The larger female (*besra*) was trained to strike partridge, dove, quail, and even snipe; the smaller male, rosy pastors, mynas, sparrows, etc. (Jerdon). Considered by some falconers to be faster and more tenacious than *bāsha* (♀ sparrow-hawk).

VOICE and CALLS. Except that it is 'very noisy' while nesting and in defence of nest, nothing recorded.

BREEDING. *Season*, March to June, chiefly April and May. *Nest*, a platform of sticks c. 15 to 25 m. up in a densely foliated deodar (*Cedrus deodara*) or other tree in forest, often one growing from the side of a precipice and overlooking a ravine. Old nests of Jungle Crows and other birds frequently appropriated. *Eggs*, 3 to 5, very handsome, indistinguishable from those of the other races and also typical of the sparrow-hawks. Roundish oval in shape, variable in coloration: most commonly bluish white, freckled, blotched, and smudged with reddish brown at the broader end. Average size of 68 eggs 38.2×30.5 mm. (Baker). Share of the sexes in the domestic chores, and period of incubation, unrecorded.

MUSEUM DIAGNOSIS. Adult male, darker and more sooty grey above, richer rufous below, than *A. v. kashmiriensis*, q.v.

Differs from S. Indian *A. v. besra* in being larger; darker, more blackish grey above, richer coloured below.

MEASUREMENTS

	Wing	Bill (from skull)	Tarsus	Tail
6 ♂♂ (ad.)	165-173.5	18-20	48.5-53	123-135.5 mm.
5 ♀♀ (ad.)	199-210	22-24	54.5-61	151-167 mm.
				(Whistler)

Two additional ♀♀ from Nepal (Biswas) fall within the above range.

COLOURS OF BARE PARTS. Iris golden yellow or orange-yellow; in young birds grey or greyish white, and later pale yellow. Bill slaty grey with black tip; cere lemon-yellow. Legs and feet bright yellow; claws blackish.

151. Southern Besra Sparrow-Hawk. *Accipiter virgatus besra* Jerdon

Accipiter Besra Jerdon, 1839, Madras Jour. Lit. Sci., 10: 84

(Soonda Jungles, South India)

Baker, FBI No. 1813, Vol. 5: 159

Plate 10, fig. 3, facing p. 192

LOCAL NAMES. *Vaishṭapa dega* (Telugu); *Urchittu* (Kannada); *Ukussa, Kurrulla goya* (Sinhala); *Sinna valluru* (Tamil).

SIZE. House Crow —; Shikra \pm . Length *c.* 29–34 cm. (*c.* 11–13 in.).

FIELD CHARACTERS. A medium-sized, short-winged Shikra-like hawk with conspicuous black mesial stripe on throat. Similar to No. 150 (q.v.) but somewhat smaller and paler.

STATUS, DISTRIBUTION and HABITAT. Resident in Ceylon (all zones) up to *c.* 1800 m. elevation, and the Western Ghats strip including Nilgiri and Palni Hills through Kerala north at least to Bombay. Once in Gujarat (Saurashtra). Sparingly in E. Ghats in Madras State, but status there uncertain. Confined to evergreen and moist deciduous biotope; affects heavy forest between *c.* 600 and at least 1200 metres elevation.

GENERAL HABITS, FOOD, etc. As in 150.

VOICE and CALLS. 'A frequently uttered squealing cry, rapidly repeated, *tcheu-tcheu-tcheu . . .*' (Mrs Lushington).

BREEDING. *Season*, March to May. *Nest* and site as in 150, the former often lined with green leaves. Shabby old nests of other birds likewise repaired and utilized. *Eggs*, 3 or 4 — exceptionally 5 — like those of 150, similarly variable. Average size of 60 eggs 36.9 × 29.7 mm. (Baker). Share of the sexes in the domestic chores, and incubation period, unrecorded.

MUSEUM DIAGNOSIS. Male (adult) similar to 150 but differs in being smaller and much paler above, more slaty grey than blackish grey, the head, back, and lesser wing-coverts darker. Below also paler rufescent.

Female dark brown without the chocolate tint; the crown only slightly darker than back. In its smaller size it matches the more richly coloured nominate race (*virgatus*) of Java.

MEASUREMENTS

	Wing	Bill (from skull)	Tarsus	Tail
4 ♂♂ (ad.)	148–155	17–18	45.5–48	112–119.5 mm.
1 ♀ (ad.)	183.5	22	—	142 mm.
4 ♀♀ (imm.)	178–187	21–22.5	52–55	137–148 mm. (Whistler)

Baker gives:

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	145–166	15–16	44–47	114–118 mm.
♀♀	182–189	18–20	46–53	136–145 mm.

COLOURS OF BARE PARTS. As in 150.

152. **Eastern Sparrow-Hawk.** *Accipiter virgatus gularis* (Temminck & Schlegel)

Astur (Nisus) gularis (Temminck & Schlegel), 1845, in Siebold, Fauna Jap., Aves, 5, pl. 2 (Japan)

Accipiter nisoides Blyth, 1847, Jour. Asiat. Soc. Bengal, 16: 727 (Malacca)
Baker, FBI Nos. 1815, 1817, Vol. 5: 162, 164

LOCAL NAMES. None recorded.

SIZE. House Crow —; Shikra \pm . Length *c.* 29–34 cm. (*c.* 11–13 in.).

FIELD CHARACTERS. As in 150, but adult male more or less uniformly blackish slaty above (blackier on crown), without white marks on nape. *Below*, chin and throat white with a narrow black mesial line. Rest of underparts varying from pale to intense rufous with faint traces of barring, often obsolete on lower breast, flanks, and abdomen. Tail with four blackish cross-bands.

Female (adult). *Above*, dark brown, blackish on head. *Below*, a distinct black mesial line on white chin and throat. Lower parts barred with grey-brown or rufous and white from foreneck to vent.

Young (immature). *Above*, brown, the feathers edged with buff or rufous. *Below*, black mesial streak on throat bolder. Breast with broad brown streaks or drops; abdomen broadly barred.

STATUS, DISTRIBUTION and HABITAT. Resident (breeding) in the Andaman Is.; not uncommon near Port Blair (B. B. Osmaston). Occurs in the Nicobars; probably breeding, but status unconfirmed.

Extralimital. Breeds also in Japan and China. Winter visitor to the Philippines. Scarce in Burma, apparently only in winter (?). Winter visitor and common passage migrant (autumn and spring) through Malaya where status undetermined.¹

MIGRATION. An immature male taken on board ship in the Bay of Bengal *c.* 10°N. lat., 90°E. long. on 22 April 1952 (F. Salomonsen, 1953, *Dansk. Orn. For. Tidr.*, 47: 138).

GENERAL HABITS and FOOD. As in 150.

VOICE and CALLS. Unrecorded.

BREEDING. *Season* in the Andamans principally March–April. *Nest*, crow-like, of sticks as in 150, often old nests of other birds; in roadside trees near habitation, mangrove forest, and padauk (*Pterocarpus marsupium*) plantation (Wickham; Osmaston). *Eggs*, 3, coloured as in the other races. Average size of 14 eggs 36.7 × 29.5 mm. (Baker). Owners plucky and aggressive in defence of nest. Other details unrecorded.

MUSEUM DIAGNOSIS. First primary (as.) about equal in length to longest secondary. 2nd primary equal to 6th or somewhat longer; 4th primary longest, 3rd and 5th only slightly shorter. Outer web of 2nd primary attenuated quite near its base; of 3rd, 4th and 5th more so and extending further upward from base (Hartert). Throat with narrow black mesial line.

¹ Gibson-Hill, C. A., 1949, *An Annotated Checklist of the Birds of Malaya*, Raffles Mus. Bull. No. 20, Singapore.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	156-173	14-15	51-54	117-137 mm.
♀♀	182-198	16-18	—	— (Baker)

Three specimens collected recently by H. Abdulali in the Middle and South Andamans measure:

	Wing	Bill (from skull)	Tarsus	Tail
1 ♂ (ad.)	150	15	45	105 mm.
1 ♂ (imm.)	159 +	16	49	111 mm.
1 ♀ (ad.)	187	22	53	133 mm. (SA)

COLOURS OF BARE PARTS. Iris ♂ crimson (La Touche); ♀ straw yellow (Whitehead). Bill slaty blue, tipped black; cere yellow. Legs and feet yellow; claws black.

Genus BUTEO Lacépède

Buteo Lacépède, 1799, Tabl. Ois. : 4. Type, by tautonymy, *Falco buteo* Linnaeus

Very closely allied to *Aquila* (eagles) from which it differs in its weaker bill and feet, the absence of a regular immature plumage, and the extreme individual variation exhibited by the members in their coloration, largely independent of age or sex.

Bill moderate or small; culmen curved from cere; commissure almost straight; festoon on cutting edge obsolete. Nostrils oval and oblique. Wings long: 4th primary (as.) longest or about equal to 5th and 3rd. First four quills deeply notched on inner web near tip. Tail rather long, slightly rounded at end. Tarsus long, partly feathered in front, transversely scutellated behind. Toes short; inner toe much shorter than outer. (Tarsus and toes almost identical with *Haliastur*, q.v.)

Genus widely distributed in Europe, Africa, America, and Asia, but unrepresented southeast from India.

Key to the Species

Page

A	Distance from tip of longest primary to longest secondary (closed wing) 145 mm. or more.....	1
B	Distance from tip of longest primary to longest secondary (closed wing) less than 145 mm.....	2
1	Pale above, inner webs of central tail-feathers generally white, tarsus 81-90 mm.....	<i>B. hemilasius</i> 253
	Dark above tipped with bright rufous, inner webs of central tail-feathers ashy grey, tarsus 56-77 mm.....	<i>B. rufinus</i> 252
2	Tail rufous, wing smaller: ♂ 350-385 mm.; ♀ 350-390 mm. ¹	<i>B. vulpinus</i> 254
	Tail dark brown, wing larger: ♂ 374-379 mm.; ♀ 389-454 mm. ²	<i>B. buteo</i> 255

¹ Composite of *A. v. gularis* and *A. v. nissoides*, now considered synonymous.

² For the sake of consistency, the measurements given above are taken from Stuart Baker, but those of Vaurie (*Am. Mus. Nov.* No. 2042, 1961, p. 9) seem a little more discrete and clear cut and are listed below for comparison.

B. vulpinus — wing ♂ 343-370 (353); ♀ 358-383 (369)

B. buteo — wing ♂ 362-400 (375); ♀ 370-408 (389)

153. **Longlegged¹ Buzzard.** *Buteo rufinus rufinus* (Cretzschmar)*Falco rufinus* Cretzschmar, 1826, in Rüppell's Atlas Vög. 49, pl. 27

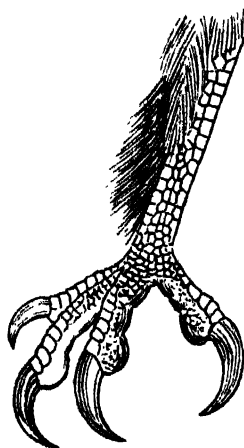
(Upper Nubia, Schendi and Sennar, and Ethiopia)

Baker, FBI No. 1796, Vol. 5: 137

Plate 10, fig. 7, facing p. 192LOCAL NAME. *Chūhāmār* (Hindi).

SIZE. Pariah Kite; length c. 61 cm. (24 in.).

FIELD CHARACTERS. Like a small eagle or immature Brahminy Kite (*Haliastur indus*) in general aspect and proportions. Extremely variable in coloration, ranging from dark brown through reddish brown and fulvous to pale sandy, with brown or almost white head, neck, and breast, and sometimes blackish moustachial stripes. The heavy build and somewhat sluggish habit, coupled with variable chocolate- or cinnamon-brown plumage, pale or dark head and unfeathered legs are suggestive.

× c. $\frac{1}{2}$

In overhead aspect the short neck, expanded, rounded, transversely barred tail—pale to bright rufous or rufous-brown—and whitish or dark brown halfmoon-shaped patches on the chestnutting underside of the broad 'splayed finger' wings are fairly diagnostic of a buzzard. But differentiation as to species with certainty impossible in the field, and not easy even with the bird in the hand (see Museum Diagnosis).

In Longlegged Buzzard pale creamy rufous tail with obsolete brown cross-bars and a broader prominent subterminal band are pointers to identity. In immature birds (?) tail ashy brown with numerous dark transverse bars.

STATUS, DISTRIBUTION and HABITAT. Within our limits breeds in the Himalayas in NW. Pakistan (Peshawar and Kohat dists.); reportedly also in Baluchistan (Ziarat and Chaman dists.), and in India in Ladakh (?), Kashmir and Garhwal, between c. 1500 and 3700 m. elevation. Winter visitor September/October to end March -- to Nepal (terai and Valley) and Sikkim, the birds in the E. Himalayas being probably derived from the E. Turkestan-Mongolian breeding area. Fairly common in winter in Sind and N. India east to Upper Assam (N. Lakhimpur dist.) south to the Deccan and possibly further, but specific sight records of buzzards unsupported by skins unsatisfactory. In breeding area affects hilly forest country with open glades etc.; in winter range every type, from semi-desert and cultivation to deciduous forest.

Extralimital. 'Breeds from S. Russia, Kirghiz Steppes, Turkestan and W. Mongolia, south to Greece, Asia Minor, and the W. Himalayas. Winters chiefly in Africa from N. Sudan to the valleys of the White and Blue Nile, and in NW. India' (Peters). Eastward to N. Burma.

GENERAL HABITS. More or less common to all buzzards. In winter range usually seen singly or in pairs perched sluggishly on a tree-top, or on a stone

¹ This is a misnomer. The name rightly belongs to *Buteo hemilasius* (154) which possesses the longest tarsi of all our buzzards.

or mound in open hummocky country. Numbers will sometimes collect (6 or 7 observed loosely together — SA) at jungle fires or fired grass patches to feast on the fleeing lizards, rats, and insects in company with other raptors and drongos, etc., frequently sauntering about on the charred ground to pick up their roasted remains. Hunts live prey by pouncing on it from a lookout post or from 30 metres or so up in the air where it sometimes hovers, head to wind like a kestrel, though rather cumbrously, to scan the ground. Much given to soaring and circling for hours on end high up in the heavens on outspread motionless wings. On approach of breeding season pairs indulge in spectacular aerobatic displays — flying round each other, plunging and stooping with wings half pulled in, shooting up with the momentum almost vertically to a wave crest, then tilting forward to nose-dive again. Occasionally a bird will do a perfect 'loop the loop', turning over completely on its back during the manoeuvre.

FOOD. Carrion, small mammals, sick and disabled birds, reptiles, frogs, locusts and other large orthopterous insects, etc. Occasionally takes domestic chickens and pigeons. In north-western semi-desert areas preys largely on gerbilles (*Meriones hurrianae*) and fat-tailed lizards (*Uromastix hardwickii*); in Kashmir (Gulmarg) on voles (Microtinae) and mouse-hares (*Ochotona* — (Osmaston).

VOICE and CALLS. A loud, wailing, kitten-like mewling uttered from time to time. Particularly noisy on approach of breeding season and during the aerial displays.

BREEDING. Authentic data very meagre. *Season*, c. March to May. *Nest*, a large stick structure built in a high tree growing on a forested hillside, or on a crag or shelf of rock. *Eggs*, 2 or 3, sometimes 4 (?), very broad ovals, variable in colour and markings: white to greyish or buff, blotched all over or only at larger end with deep rich brown with some obsolete grey smears. Average size of 8 Indian-taken eggs 59.6×47.6 mm. (Baker), which agrees fairly closely with the average of European eggs.

Share of the sexes in domestic chores, period of incubation, etc., unrecorded in India.

MUSEUM DIAGNOSIS. Tail in adult *rufinus* pale rufous with barring obsolete except for a dark subterminal band. For description of various plumage phases see Baker, loc. cit.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	415-431	32-34	56-62	228-250 mm.
♀♀	428-458	—	60-77	230-257 mm.
				(Baker)

COLOURS OF BARE PARTS. Iris golden brown or yellowish brown. Bill horny or brownish slate, black at tip, yellowish at base of lower mandible and gape; cere yellowish green. Legs and feet dingy or pale lemon-yellow.

154. **Upland Buzzard.** *Buteo hemilasius* Temminck & Schlegel

Buteo hemilasius Temminck & Schlegel, 1845 (1844), in Siebold, Fauna Jap., Aves: 18, pl. 7 (Japan)

Baker, FBI No. 1197, Vol. 5: 140

Plate 10, fig. 9, facing p. 192

LOCAL NAME. *Chūhāmār* (Hindi) for all buzzards.

SIZE. Pariah Kite +; c. 71 cm. (28 in.).

FIELD CHARACTERS. Similar to Longlegged Buzzard, slightly larger, but also extremely variable in coloration and doubtfully identifiable in the field. A usual phase is pale greyish brown above, with some rufous on nape, upper back and upper tail-coverts. White bases of feathers conspicuous on head and neck. *Below*, streaked with brown on throat, and with large brown irregular spots on breast and abdomen. Sometimes underparts all brown. Tail brown rather than rufous, with a subterminal and seven other bars, somewhat more clearly visible than in Longlegged Buzzard.

STATUS, DISTRIBUTION and HABITAT. Not satisfactorily worked out owing to possible confusion with other species. Evidently a rare winter visitor to the Himalayas. Very few records; specimens definitely identified only from Kashmir, Himachal Pradesh, Punjab, Nepal, Sikkim.

Extralimal. 'Breeds from Lake Baikal to Ussuri and the Amur south to Tibet and Mongolia, probably also in N. China. Winters south to India, Burma and C. China' (Peters).

GENERAL HABITS, FOOD, etc. Similar to 153. No information available specifically for India. Apparently more powerful than Longlegged Buzzard, reported in Tibet as preying on hares, Tibetan Sandgrouse (*Syrrhaptes tibetanus*) and snowcock (*Tetraogallus tibetanus*), and alleged to take young lambs (F. M. Bailey).

VOICE and CALLS. Unrecorded in India.

BREEDING. *Extralimal* as far as known, but possibly may nest in the higher Himalayas. *Nest*, a large stick structure on ledges of cliffs etc.

MUSEUM DIAGNOSIS. Tail in adults with one subterminal and seven other bars; base and inner webs of rectrices white; flanks dark brown. Tarsi closely feathered in front down to bases of toes; naked and scutellated behind. For description of plumage phases see Baker, loc. cit.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	480-501	34-36	81-90	255-282 mm. (Baker)

COLOURS OF BARE PARTS. Iris buff to golden yellow, or white. Bill bluish or dusky horn, paler and yellowish at gape and on base of lower mandible; cere greenish yellow. Legs and feet wax yellow, or yellowish grey; claws black.

155. Desert Buzzard. *Buteo vulpinus vulpinus* (Gloger)

Falco vulpinus 'Licht.' = Gloger, 1833, Das Abändern der Vögel: 141 (Africa)
Baker, FBI No. 1798, Vol. 5: 142

LOCAL NAMES. *Dang pang ti on*, *Pang ti ong nok* (Lepcha).

SIZE. Pariah Kite —; length c. 51-56 cm. (20-22 in.).

FIELD CHARACTERS. Similar to Longlegged Buzzard but smaller. Also variable in coloration. In a common phase:

Adult. *Above*, brown, the feathers largely edged with rufous. *Below*, rufous, paler on throat, faintly barred and spotted on abdomen. Tail

diagnostic bright rufous (*v.* pale creamy rufous in Longlegged) with a dark subterminal band and generally one or two more visible on outer rectrices. Sexes alike.

Another phase (age ?) is whitish or pale buff below, more distinctly barred with light rufous-brown.

STATUS, DISTRIBUTION and HABITAT. Claimed to breed in W. Pakistan (NWF. Province) and Kashmir, but records uncertain and conflicting. Occurrence south of the Himalayas unconfirmed.

Extralimital. 'Breeds from the Urals and SE. Russia east to the Kentei Mountains and Turkestan. Winters in E. Africa, Arabia, and W. India' (Peters).

GENERAL HABITS, FOOD, VOICE, etc. Nothing unequivocally recorded for India. 'A shrill, harsh *ky-yah*, much harsher than the mewing cry of *Buteo buteo*' (Kirke-Swann).

BREEDING. Doubtful. *Season* in NWFP. and Kashmir mentioned by Baker as March to May. Needs confirmation by collecting of breeding birds.

MUSEUM DIAGNOSIS. Tail bright rufous. Tarsus normally only one-third feathered in front; sometimes half. Naked portion scutellated in front; rarely reticulated (Baker). For description of plumages see Baker, loc. cit.; Witherby 1939, 3: 55-6.

MEASUREMENTS

	Wing	Bill (from cere)	Tarsus	Tail
♂♂	350-385	20-23	65-75	175-195 mm.
♀♀	350-390	—	—	—

(Witherby)

COLOURS OF BARE PARTS. Iris hazel to yellow. Bill dark plumbeous, lighter at base and gape; cere yellow. Legs and feet yellow; claws black.

156. **Buzzard.** *Buteo buteo burmanicus* Hume

Buteo burmanicus Hume, 1875, *Stray Feathers*, 3: 30, in text
(Thayetmyo, Upper Pegu)

Baker, FBI No. 1799, Vol. 5: 143

Plate 10, fig. 8, facing p. 192

LOCAL NAMES. For all buzzards *Chūhāmār* (Hindi); *Ukussa* (Tamil); *Parundu* (Tamil, Malayalam — apparently general for all hawks).

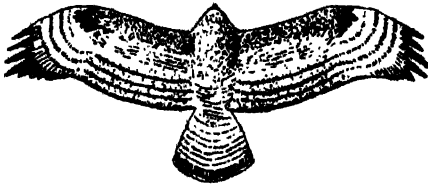
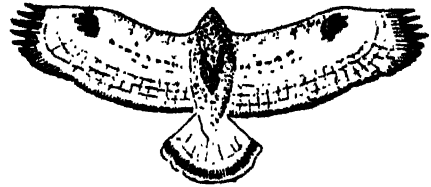
SIZE. Pariah Kite —; length *c.* 51-56 cm. (20-22 in.).

FIELD CHARACTERS. Like other buzzards has dark and light plumage phases. In one of these, with creamy brown head and patchy underwing, confusingly like immature Brahminy Kite (*Haliastur indus*). Field identification unreliable. (See Museum Diagnosis.)

STATUS, DISTRIBUTION and HABITAT. Unsatisfactorily known owing to chaos in nomenclature, confusion in field identifications, and lack of better collected material. All Indian records of buzzards, especially of breeding, should be treated with reservation unless supported by skins.

Irregular and uncommon but widespread winter visitor. N. India, Nepal, (between *c.* 275 and 2240 m. alt.), Sikkim (?), western Deccan (?), Kerala (hills), Ceylon (all zones, to *c.* 2000 m. alt.).

Extralimal. 'Breeds in Asia from E. Turkestan and the Upper Yenesei north to Dauria and Lake Baikal, east to Ussuriland, south to the Himalayas, Manchuria, Korea, and Japan. Winters south to India, Burma, and S. China' (Peters).

Common Buzzard (*B. buteo*)Roughlegged Buzzard (*B. lagopus*). SE

Overhead view
(Diagrammatic sketches by L. Tinbergen)

GENERAL HABITS, FOOD, VOICE, etc. Unrecorded specifically.

BREEDING. *Extralimal.* *Nest*, the usual stick structure built on ledges of cliffs or on the ground on steep hillsides.

MUSEUM DIAGNOSIS. Tail more brown than rufous, with 4 or 5 nearly obsolete dark bars; flanks and thighs rufous. Feathering on tarsus variable; in most birds covering half to two-thirds in front. For description of plumage phases see Baker, loc. cit.

Distinguished from immature Brahminy Kite (*Haliastur indus*) in comparable colour phase by longer tarsus: 63-74 mm. *v.* 51-59 mm.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	374-379	c. 29	63-65	198-209 mm.
♀♀	389-454	29-36	59-74	225-248 mm.
				(Baker)

COLOURS OF BARE PARTS. Iris brown. Bill plumbeous-brown to black, the base paler; cere yellow. Legs and feet yellow; claws black.

Genus BUTASTUR Hodgson

Butastur Hodgson, 1843, Jour. Asiat. Soc. Bengal, 12: 311. Type, by original designation, *Circus teesa* Franklin

Bill laterally compressed; culmen curved from base; festoon generally present on edge of upper mandible, sometimes well marked. Nostrils oval, oblique. Wings long: 3rd primary (as.) longest, 4th almost subequal. 2nd primary only a little longer than 5th, these two much shorter than 3rd and 4th. First 3 primaries markedly, 4th slightly, emarginate on inner web. Tail rounded. Toes short; tarsus considerably longer than middle toe, feathered only at extreme top; covered with imbricate shields, rather larger in front.

Genus represented in Africa and the Oriental Region; only one species within our limits.

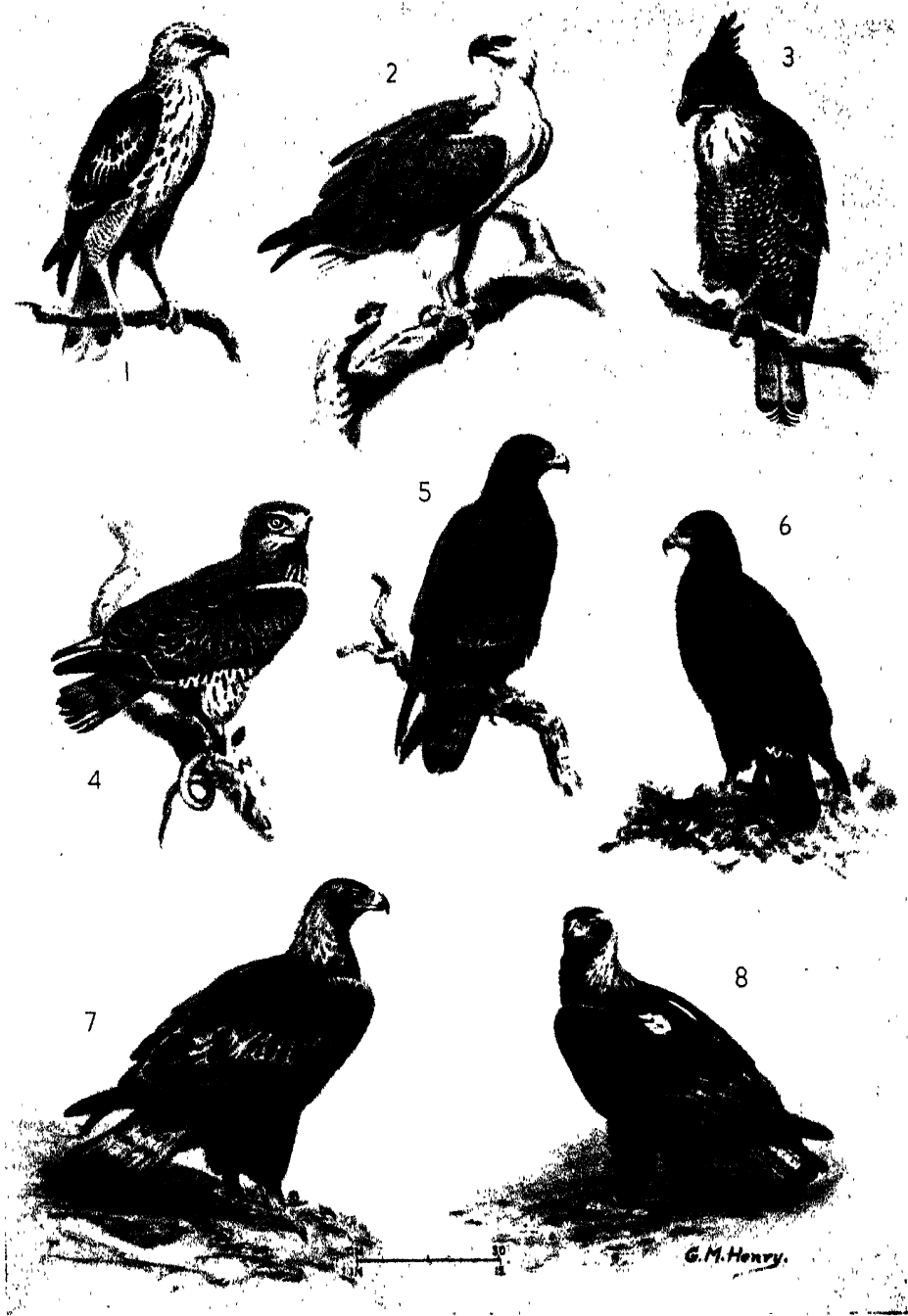


PLATE 14

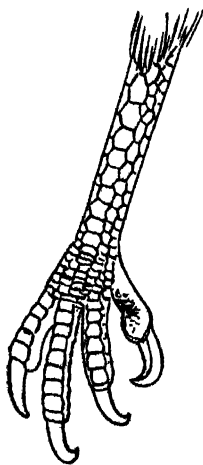
1 *Spizaetus (cirrhatus) Immaetus*, Changeable Hawk-Eagle (160). 2 *Haliaeetus leucogaster*, Whitebellied Sea Eagle (173). 3 *Spizaetus n. nipalensis*, Hodgson's Hawk-Eagle (158). 4 *Circus g. gallicus*, Short-toed Eagle (195). 5 *Aquila n. nipalensis*, Steppe Eagle (169). 6 *Aquila clanga*, Greater Spotted Eagle (170). 7 *Aquila c. daphanea*, Golden Eagle (166). 8 *Aquila heliaca*, Imperial Eagle (167).

157. **White-eyed Buzzard-Eagle.** *Butastur teesa* (Franklin)*Circus Tessa* Franklin, 1832 (1831), Proc. zool. Soc. Lond., pt. 1: 115(Farther India = Ganges-Nerbudda, *apud* Baker)

Baker, FBI No. 1774, Vol. 5: 104

Plate 11, fig. 1, facing p. 208**LOCAL NAMES.** *Tisa* (Hindi); *Buda mali gedda* (Telugu); *Yellur* (Yerkali); *Parundu* (Malayalam, for all hawks).**SIZE.** Jungle Crow \pm ; length c. 43 cm. (17 in.).**FIELD CHARACTERS.** A small greyish brown hawk with white throat, two dark cheek-stripes, and a third central stripe running down from chin. A small whitish patch on nape. Underparts brown and whitish. Orange-yellow cere and white (or pale yellow) eyes conspicuous at close range and through binoculars. At rest closed wings reach almost to end of rufous-tinged tail. Sexes alike.

In overhead flight silvery grey-brown undersides of broad, blunt wings, contrasting with darker body, a suggestive clue. From above a patch of buffy grey on wing shoulder is conspicuous.

Young (immature). Feathers of crown and nape brown with broad pale edges. Forehead and a broad supercilium buffy white. Underparts variable, white to buff, the feathers more or less streaked with dark brown. Cheek-stripes narrow or absent.**STATUS, DISTRIBUTION and HABITAT.** Resident practically throughout our area from about 1200 m. in the Himalayas (less common south of Madhya Pradesh) to Kanyakumari, and from W. Pakistan (Baluchistan) to Assam and E. Pakistan. Nepal. Absent in Ceylon. Affects open deciduous forest, and scrub-and-bush and cultivated country in the plains. Avoids moist forest biotope.**Extralimital.** Northern and western Burma south to Tenasserim.**GENERAL HABITS.** Sluggish and usually tame. Single birds seen day after day perched on the same stump, tree-top or telegraph pole in a chosen locality whence they pounce on any small animals of manageable size that show themselves in the surroundings below. Sometimes one will take up its position on the ground, on some mound or boundary stone in scrub jungle or cultivation whence to hurl itself on any lizard or grasshopper that stirs in the proximity, changing the coign of vantage from time to time. Occasionally walks about in the open, picking up flying termites as they emerge from their holes, or on charred ground after a forest fire, even while the rubbish is still smouldering, looking for roasted lizards and other titbits. Although somewhat sluggish, its flight is swift and direct, attained by rapid strokes of the rounded wings, reminiscent of a shikra. In the breeding season the birds become very noisy. Pairs commonly soar in circles high up in the sky for long periods and also indulge in spectacular aerial play, side-slipping, somersaulting, and stooping at each other with astonishing velocity. $\times c. \frac{2}{3}$

FOOD. Rats, and mice, small snakes, lizards, frogs, crabs. Also locusts, grasshoppers and other large insects, and winged termites — sometimes hawked in the air. Though accused of destroying quails and partridges, it seldom takes any except a sickly or disabled one. On the contrary it is highly beneficial as a destroyer of rats and lizards which are proven enemies of ground game. Among stomach contents the following identified specifically: Mammals: *Meriones hurrianæ*. Reptiles: *Natrix stolatus*, *Mabuya carinata*. Insects: *Chrotogonus* sp., *Termes obesus*, *Catharsius sabaeus*, *Anomala varians* (larvae), *Brachytrypes achatinus*, *Schizodactylus monstrosus*, *Gryllotalpa africana* (Mason & Lefroy); *Acridium peregrinum* (?), katydid grasshopper.

VOICE and CALLS. A peculiar plaintive, mewing *pit-weer*, *pit-weer*, constantly uttered in the nest precincts in breeding season; also while the pair is circling aloft.

BREEDING. *Season*, chiefly between February and May, varying with locality. *Nest*, a loose unlined structure of twigs like a crow's. Placed fairly high up (9–12 m.) in the fork or thickly foliated branch of a tree such as mango or neem, preferably one of a clump. *Eggs*, normally 3; greenish white, broad ovals with a fairly smooth texture. Usually unmarked; rarely with flecks of pale reddish. Average size of 100 eggs, 46.4×38.4 mm. (Baker). Both sexes share in building the nest and feeding the young. Incubation by female alone; period about 19 days.

MUSEUM DIAGNOSIS. In newly hatched chick prepennae and preplumulae both present. Prepennae fairly long and plentiful over the whole body: white above, tinged with isabelline at tips; white below. Preplumulae short, tufted, white (C. B. Ticehurst).

MEASUREMENTS

	Wing	Bill (from skull)	Tarsus	Tail
♂♂	278–304	28–32	62–67	169–180 mm.
♀♀	295–314	29–32	61–68	170–183 mm.
				(SA)

COLOURS OF BARE PARTS. Iris: adult almost white or pale yellow; immature, brown. Bill black at tip, changing to yellow on gape, base of lower mandible, and cere. Legs and feet dingy orange-yellow; claws black.

Downy nestling. Iris dark brown. Bill bluish, black at tip; cere yellow. Legs yellow, claws slate.

Genus *SPIZAETUS* Vieillot

Spizaetus Vieillot, 1816, Analyse : 24. Type, by subsequent designation, *Falco ornatus* Daudin. (Gray, 1840, List Gen. Bds. : 2)

Limnaetops Baker, 1930, Fauna Brit. Ind. Bds., ed. 2, 7 : 408. Type, by original designation, *Limnaetops c. cirrhatus* (Gmelin) = *Falco cirrhatus* Gmelin

Cf. Amadon, D., 1953, Ibis, 95: 492–500.

An occipital crest of several long black feathers (c. 10–13 cm.) generally but not always present. Bill short, rather deep at base; culmen laterally compressed; curved throughout, with a prominent festoon on edge of upper mandible. Nostrils round, ear-shaped. Wings short and rounded; 5th primary (as.) longest or 4th and 5th subequal. Longest primary exceeds longest secondary by less than length of tarsus. Tail longer than in most true eagles, approximating the Sparrow-Hawk in its

proportions, Tarsus long and slender; fully feathered. Toes short and stout; outer toe longer than inner; claws long and well curved.

A forest-haunting genus, represented in Africa, tropical America and throughout the Oriental Region.

Key to the Species

	Page
Feathering of tarsus extending to division of toes <i>S. nipalensis</i>	259
Feathering of tarsus not extending to division of toes <i>S. cirrhatus</i>	261

SPIZAETUS NIPALENSIS (Hodgson)

Key to the Subspecies

Darker and larger; wing ♂ ♀ 440–502 mm.	<i>S. n. nipalensis</i>
Paler and smaller; wing ♂ ♀ 402–453 mm.	<i>S. n. kelaarti</i>

158. Hodgson's or Feathertoeed Hawk-Eagle. *Spizaetus nipalensis nipalensis* (Hodgson)

Nisaetus Nipalensis Hodgson, 1836, Jour. Asiat. Soc. Bengal, 5: 229, pl. 7 (Nepal)
Baker, FBI No. 1760, Vol. 5: 89

Plate 14, fig. 3, facing p. 256

LOCAL NAMES. *Kanda panthiong*, *Kanzha chil* (Lepcha); *Reijore* (Sikkim); Spotted Hawk-Eagle of Jerdon.

SIZE. Kite +; length c. 72 cm. (c. 29 in.).

FIELD CHARACTERS. A comparatively slender forest-frequenting eagle with a prominent crest of a few long black feathers (white-tipped in young birds) sticking out from hindcrown, and long, slender, feathered legs. *Above*, dark brown, barred with white on rump and upper tail-coverts. Tail dark brown barred with dark grey. *Below*, two broad black moustachial streaks to foreneck and a third down centre of chin and throat. Foreneck and upper breast fulvous white, with broad black vertical streaks or oval drops, or (in very old birds) broken brown-and-white barring. Remainder of underparts chocolate-brown, paler on lower breast, darker on abdomen. Flanks, thigh- and under tail-coverts barred brown and white. Sexes alike; female larger.

Young birds till their second year show a confusing variety of plumages, and are difficult to tell in the field.

In overhead flight all hawk-eagles of this genus appear grey throughout, the body sometimes darker sometimes lighter than the wings, profusely barred and streaked ('spotted'). They may be further identified by the short rounded wings, upturned near the end, and the longish tail.

STATUS, DISTRIBUTION and HABITAT. Resident in the Himalayas between 600 and 2400 m. altitude from NW. Pakistan (Hazara dist.) and Kashmir to eastern Assam, north and south of Brahmaputra river; Nepal; Manipur; E. Pakistan (?). In winter wanders into the Gangetic Plain; has been taken as far south as Pachmarhi (lat. 22°30'N.) in Madhya Pradesh. Affects hill forest.

Extralimital. Yunnan, N. Burma (?).

GENERAL HABITS. Very similar to the commoner Indian Crested Hawk-Eagle (*Spizaetus c. cirrhatu*s) of peninsular India, q.v. Hunts from ambush up in branches of leafy tree, at edge of forest clearing, pouncing on quarry coming out to feed in the open. Very tractable, and easily tamed and trained to hunt (Donald).

FOOD. Chiefly small mammals like hares and large game birds like pheasants. Once observed striking, carrying off and eating a fish (Ingliis).

VOICE and CALLS. 'A shrill metallic whistle which might easily be imitated on a penny whistle' (A. E. Jones). More information lacking.

BREEDING. *Season*, principally February and March, sometimes extending into April and even May. *Nest*, a large platform of sticks with a depression in the centre lined with green leaves; repaired and used in successive years. Some birds apparently have alternate nests used irregularly, one this season the other possibly the next. Built 12 to 25 metres up in large trees like sal (*Shorea robusta*) — in the higher Himalayas almost invariably deodar (*Cedrus deodara*) — in forest at the edge of a broad nullah or ravine overlooking forest and cultivation. *Eggs*, a single, rarely 2; mostly of two types (a) pale clay colour or reddish white, profusely stippled with red and spattered with darker red or red-brown blotches, (b) white, variously blotched and spotted with rich red, chiefly at the broader end. Average size of 16 eggs 69.9 × 53.8 mm. (Baker). Share of the sexes in building unrecorded. Apparently female alone incubates; period unknown. Birds very bold and truculent in defence of nest.

MUSEUM DIAGNOSIS. In the species *nipalensis* feathering of tarsus extends to base of toes, *contra* in *cirrhatu*s where it terminates just above them. For plumages and other details see Baker, loc. cit., and Amadon, loc. cit. *infra*.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	475–491	38–39	c. 180	283–298 mm.
A sexed ♀ (from Himalayas) has wing 502 mm.				(Baker)

Amadon¹ gives for Indian examples:

1 ♂ ad. Wing 440; 1 ♂ imm. 415 mm.

2 ♀ ♀ ad. Wing 440, 480; 1 ♀ imm. 440? mm.

COLOURS OF BARE PARTS. Adult: Iris brilliant golden yellow. Bill black; cere blackish grey. Feet pale dull yellow, yellowish white, or livid yellow; claws black (Baker).

Iris in nestling bluish grey; in young (1 to 2 years old) bright yellow; then bright golden and finally orange in very old birds (Donald).

159. Legge's or Ceylon Feathertoe Hawk-Eagle. *Spizaetus nipalensis kelaarti* Legge

Spizaetus kelaarti Legge, 1878, Ibis: 202 (Ceylon)

Baker, FBI No. 1762, Vol. 5: 91

LOCAL NAMES. *Maha konde rajaliya* (Sinhala); *Periya konde rasali*, *Kalugu* (Tamil).

SIZE. Kite +; length c. 70 cm. (c. 28 in.).

¹ Amadon, Dean (1953): 'Remarks on the Asiatic Hawk-Eagles of the genus *Spizaetus*,' *Ibis*, 95: 492–500.

FIELD CHARACTERS. As for the nominate race. Superficially a larger edition of Legge's Baza (126), q.v. See Museum Diagnosis, for differentiation from No. 158 in the hand.

STATUS, DISTRIBUTION and HABITAT. Resident. Ceylon (hill zone above c. 600 m.); Kerala, Nilgiris, W. Mysore (Malnad). Affects evergreen hill forest.

GENERAL HABITS. Same as of 158. Occasionally takes to poultry-lifting near forest villages.

FOOD. As in 158.

VOICE and CALLS. Normally silent. A 'loud scream' while soaring (Legge).

BREEDING. *Season.* December to February/March in Ceylon. Stewart found most eggs in Kerala to be laid in January. *Nest* and site similar to those of the nominate race, the former often at heights of 25 to 30 m. in lofty forest trees. *Eggs*, normally a singleton, white to greyish white lightly freckled or speckled with reddish; very similar to eggs of *S. cirrhatus*. Average size of 32 eggs 69.1×54.6 mm. (Baker). Said to be less bold than the northern bird in defence of nest.

MUSEUM DIAGNOSIS. Differs from the nominate race (158) in being smaller and paler, especially on the underparts. However, according to Amadon, loc. cit., the form *kelaarti* requires confirmation.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus
♂ ♂	427-453	c. 42	107-109
♀	442	—	—
			(Baker)

A ♂ from Kerala measures: Wing 402; bill (from skull) 46; tarsus 98.5; tail 261 mm. (SA). The only specimen (subadult ♂) examined by Amadon has wing 410 mm.

COLOURS OF BARE PARTS. As in 158.

SPIZAETUS CIRRHATUS (Gmelin)

Key to the Subspecies

		Page
A	A long crest c. 10-14 mm. present.....	<i>S. c. cirrhatus</i> 262
B	Crest short or rudimentary.....	1
1	Larger; wing over 400 mm.....	<i>S. (c.) limnaetus</i> 261
	Smaller; wing under 400 mm.....	<i>S. c. andamanensis</i> 265

160. Changeable Hawk-Eagle. *Spizaetus (cirrhatus) limnaetus* (Horsfield)

Falco Limnaetus Horsfield, 1821, Trans. Linn. Soc. London, 13(1): 138 (Java)

Baker, FBI No. 1758, Vol. 5: 87

Plate 14, fig. 1, facing p. 256

LOCAL NAMES. *Sadal* (Hindi, Bengali); *Morhaiiu* (Garhwal).

SIZE. Kite +; length c. 70 cm. (c. 28 in.).

FIELD CHARACTERS. Crest rudimentary or very small, seldom longer than about 3 cm. Otherwise bird similar to Crested Hawk-Eagle (No. 161) but

with paler underparts, and more or less barred with rufous-white on the brown abdomen and vent. Dimorphic: also commonly met in a melanistic phase with the entire plumage dark chocolate-brown, or almost black, the latter confusable with Black Eagle (No. 172), q.v. Intermediates between the two phases occur.

Young (immature). Lower parts often pure white without any spotting or barring.

STATUS, DISTRIBUTION and HABITAT. Resident in the sub-Himalayan terai and duars from Garhwal to Bengal, (E. Pakistan?), and Assam; Nepal. Affects forest biotope in the foothills and up to c. 1900 m. altitude.

Extralimital. Burma, Thailand, Malay Peninsula, Indochinese countries, Sumatra, Java, Borneo, Philippine Islands.

GENERAL HABITS. As in 161. Wild and wary, flying off to another perch a hundred metres away when approached, and so on, constantly maintaining distance between itself and observer. If persistently followed, becomes suspicious and flies away over the tree-tops, quickly spiralling upward to great height.

FOOD. As in 161. Often becomes a habitual and determined robber of domestic poultry from forest villages.

VOICE and CALLS. Silent except in the breeding season. When soaring aloft, utters 'a clear whistling call very closely resembling the cry of the curlew — *cur-lee-ee-ee*' (G. C. Madoc, Malaya). Also likened to the screams of the Serpent Eagle (*Spilornis cheela*).

BREEDING. From plains level to c. 1800 m. altitude, chiefly foothills between 300 and 900 metres. *Season*, January to April: principally February and March. *Nest*, the typical large platform of sticks and twigs, c. 1 metre across and 35 cm. deep, with a shallow depression for the eggs, lined with green leaves. Built high up in a forest tree. *Egg*, a singleton, indistinguishable from that of 161. Average size of 16 eggs 69.8×51.9 mm. (Baker). Share of the sexes in the domestic chores, and incubation period, unrecorded.

MUSEUM DIAGNOSIS. Considered by some authors as a crestless race of *S. cirrhatus*, by others as a valid species (*S. limnaeetus*) because of the apparent sympatry in parts of Burma and Thailand. Its true position needs further study.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	400-438	39-41	100-103	240-267 mm. (Baker)

COLOURS OF BARE PARTS. As in 161.

161. Indian Crested Hawk-Eagle. *Spizaetus cirrhatus cirrhatus* (Gmelin)

Falco cirrhatus Gmelin, 1788, Syst. Nat., ed. 13, 1 (1): 275 (Ceylon)

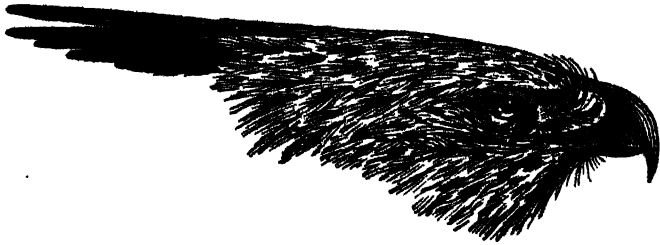
Baker, FBI No. 1756, Vol. 5: 85

Plate 15, fig. 4, facing p. 272

LOCAL NAMES. *Shah baaz* (Hindi); *Jutu bhyri*, *Namli puri gāddā* (Telugu); *Mōr baaz* (Gujarat).

SIZE. Kite +; length c. 72 cm. (c. 29 in.).

FIELD CHARACTERS. A comparatively slender, crested forest eagle, normally brown above white below, with narrow black longitudinal streaks on throat, and broad chocolate streaks on breast. The prominent crest of a few long black feathers sticking out from hindcrown, and long slender but powerful feathered legs, are diagnostic. Sexes alike; female larger.



× c. $\frac{1}{2}$

In overhead flight, the short, broad, rounded wings (upturned near tip), longish tail, white body (lightly or heavily spotted) are leading pointers to the adult.

Young (immature). Head buffy or brownish white; the long black crest feathers with whitish apical edges. Tips of greater wing-coverts largely buffy white. Underparts uniform buffy white with faint, sparse, fine shaft streaks on breast.

STATUS, DISTRIBUTION and HABITAT. Fairly common in well-wooded tracts throughout peninsular India roughly south of the range of *S. n. nipalensis* (No. 158), and in Ceylon. Its northern limit is fairly indicated by a line drawn from Mount Abu (Rajasthan) to Etawah (U.P.) and thence through Sherghati (Bihar) to Calcutta (Hume, SF, 3: 446). Affects deciduous and semi-evergreen forest biotope.

Extralimital. Burma (Myitkyina dist.), SE. Thailand — probably straggler.

GENERAL HABITS. Keeps to open forest and the neighbourhood of outlying forest villages and cultivation. Perches bolt upright on a horizontal bough up in the foliage canopy of a high tree overlooking a glade or clearing, not so much hidden by the leaves as backed and camouflaged by them. The bird thus remains surprisingly unnoticed till it flies out on the observer's approach to settle in another tree some distance away with a graceful upward sweep into the branches. From such ambush it surveys the surroundings for any small animal venturing into the open, pouncing on it with a whirlwind rush, smothering it with its wings, and bearing it away in its powerful talons. Perhaps less given to soaring than many other raptors except during the breeding season when pairs — even single birds (male?) — indulge in noisy aerial displays, zooming up vertically and nose-diving, or stooping at each other at lightning speed, sometimes doing a complete looping-the-loop turn in the air.

FOOD. Hares, young peafowl, junglefowl, partridges, bush quails, squirrels, field rats, lizards, etc. Very destructive to domestic poultry around forest villages.

VOICE and CALLS. A loud high-pitched cry *Ki-ki-ki-ki-ki-ki-ki-ki-kee*, commencing short, rising in crescendo, and ending in a long-drawn scream. Mostly heard during the breeding season, from perch as well as from air. Also alleged, with some degree of plausibility, to be the enigmatical 'Devil Bird' which sometimes utters the weird nocturnal cries — a wailing *hoo-hoo* immediately preceded by a 'harsh cough' — as of a woman being strangled (JBNHS, 1925, 30: 914-15). Final confirmation of identity is lacking.

BREEDING. *Season*, in peninsular India overall November to April, chiefly January and February; in Ceylon continuing till June. *Nest*, a large platform of sticks and twigs, c. 95 cm. across and some 45 cm. thick with a central depression lined with fresh green leaves kept renovated (by ♂ ?) during incubation. Built between 12 and 30 metres up in a tall *Ficus*, *Bassia*, *Dipterocarpus*, *Albizia* or similar tree generally on a hillside or edge of a ravine and commanding a wide view. *Egg*, a singleton, white, feebly speckled and blotched with light reddish at the larger end; sometimes sparingly all over. Average size c. 64.0 × 50.5 mm. Ceylon eggs generally smaller. Both sexes share in building the nest, but apparently female alone incubates. Incubation period undetermined; in one case calculated as over 40 days (Phillips).

MUSEUM DIAGNOSIS. As for the genus. The species differs from *S. nipalensis* (158) by the feathering of the tarsus terminating just above the toes, not extending down to their base. Resemblance between immatures of the two species particularly striking. Ceylon and S. Indian birds are smaller but otherwise identical with the peninsular population. Size difference clinal, not meriting racial separation as hitherto done. For plumage and other details see Baker, loc. cit.

MEASUREMENTS

	Wing	Bill (from skull)	Tarsus	Tail
♂♂ ad.	351-442	35-44	90-106	229-285 mm.
♀♀ ad.	353-462	37-46	96-106	266-300 mm. (SA)

COLOURS OF BARE PARTS. Adult. Iris pale khaki to bright orange-yellow varying with age. Bill horny black; cere greyish to greenish brown. Gape and eyelids greyish green. Feet lemon-yellow; claws horny black.

Downy nestling. Iris greyish brown. Bill horny black; cere and bare skin in front of and around eyes slaty grey; gape greenish grey; mouth pink. Feet pale greenish grey; claws horny black.

Chick (in down, c. fortnight old). Prepennae and preplumulae white. A thick rudimentary tuft of white down at nape where crest in adult. Brown primaries sprouting; also bastard wing quills, secondaries, upper wing-coverts, dark brown scapulars, upper tail-coverts and rectrices. A central (spinal) tract of brown feathers down back of neck to midway between the scapulars, and two tracts of fulvous brown feathers on either side of breast.

MISCELLANEOUS. A downy nestling being hand-reared drank water regularly — avidly and copiously — which shows the obvious need for it and poses the question: How do eagles carry water to their nest-young, as they must surely do?

162. **Andamans Crested Hawk-Eagle.** *Spizaetus cirrhatus andamanensis*
Tytler

Spizaetus Andamanensis Tytler, 1865, Proc. Asiat. Soc. Bengal: 112

(Port Blair, S. Andaman Island)

Baker, FBI No. 1759, Vol. 5: 88

LOCAL NAME. *Arungadda* (Andamans, near Port Blair).

SIZE. Kite; length *c.* 61 cm. (24 in.).

FIELD CHARACTERS. Smaller even than Ceylon examples of Indian Crested Hawk-Eagle (No. 161) and with a markedly shorter crest; otherwise quite similar.

STATUS, DISTRIBUTION and HABITAT. Rather rare resident. Race endemic to the Andaman group of islands. (Nicobars?). Generally keeps to outskirts of forest near open places (Davison).

GENERAL HABITS. Nothing specifically recorded as different from the Indian bird.

FOOD. Frequently takes a chicken or pigeon close to a bungalow. One observed to capture a Myna (*Acridotheres tristis*), and another devouring a Koel (*Eudynamis*) — A. L. Butler.

VOICE. Unrecorded.

BREEDING. The only nest known was found by B. B. Osmaston at Haddo, near Port Blair, containing a single egg on 21 January. It was the typical twig structure *c.* 10 metres up in a teak tree, lined with green jamun (*Eugenia*) leaves. Egg, as of the peninsular race (161), measuring 62.2 × 50.1 mm.

MUSEUM DIAGNOSIS. Size smaller than *S. c. cirrhatus*; length of crest intermediate between it and *S. (c.) limnaeetus* (160).

MEASUREMENTS. Wing 1 ♂ 355, 1 ♀ 377 (Amadon, loc. cit.).

A sexed ♂ in the British Museum collection has wing 375, and a sexed ♀ 366 mm.; bill from feathers 38 and 37 mm. respectively (Baker).

COLOURS OF BARE PARTS. As in 161.

Genus *HIERAETUS* Kaup

Hieraetus Kaup, 1844, Classif. Säugeth. u. Vög. : 120. Type, by original designation, *Falco pennata* Gmelin

Like *Spizaetus* contains hawk-eagles which differ from true eagles (e.g. *Aquila*) in their lighter and slenderer build, smaller bills, longer and slenderer tarsi, and proportionately longer tails. Most species have a phase of plumage in which the underparts are partly or wholly white. The emarginations of the primaries are generally much deeper than in the genus *Aquila*.

Bill moderately strong, much hooked at the end and with a prominent festoon to upper mandible. Nostrils elliptical and oblique. Tarsi feathered to the toes. Toes long: outer toe somewhat longer than inner. Claws sharp and well curved: inner and hind claw both large, the latter larger. Wing long: 4th primary (as.) longest, exceeding secondaries by more than length of tarsus. Tail nearly square, equal to more than half the length of wing.

Genus represented in Europe, Asia, Africa, and Australia. Two species occur in India.

Key to the Species

- Larger; wing over 480 mm. *H. fasciatus*
Smaller; wing under 450 mm. *H. pennatus*

163. **Bonelli's or Slender Hawk-Eagle.** *Hieraetus fasciatus fasciatus*
(Vieillot)

Aquila fasciata Vieillot, 1822, Mém. Soc. Linn. Paris, 2(2): 152 (Montpellier, France)
Baker, FBI No. 1752, Vol. 5: 77

Plate 17, fig. 5, facing p. 320

LOCAL NAMES. *Morangi* (Hindi); *Kundeli salawa* (Telugu); *Rajali* (Tamil).
Crestless Hawk-Eagle of Jerdon.

SIZE. Kite +; length c. 68–72 cm. (27–29 in.).

FIELD CHARACTERS. A comparatively slender but powerful uncrested raptor with a proportionately longer tail than in true eagles, extending 5 to 8 cm. beyond tips of closed wings.

Adult. *Above*, dark umber-brown. *Below*, white to rufous-buff, streaked with blackish. Tail dark grey above, whitish below with a broad black subterminal band and several others narrower and ill-defined. Sexes alike; female larger.

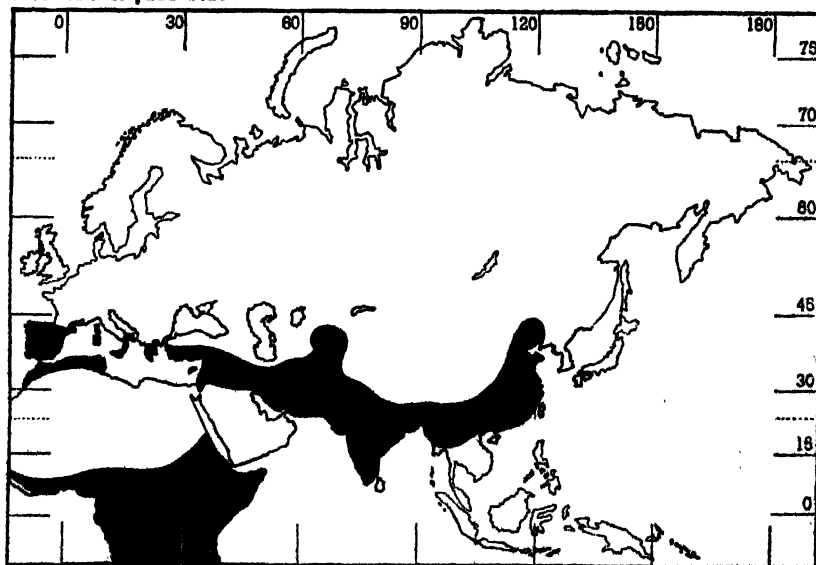
In overhead aspect the silvery white body, dark brown under wing-coverts, finely grey-barred flight feathers, and broad black subterminal band in the longish tail are suggestive pointers for the adult.

Young (immature). *Above*, paler brown, the feathers of head and nape with still paler edges. *Below*, rufous or rufous-buff, streaked with blackish. Tail narrowly barred and mottled; without the broad subterminal band.

Distinguished in flight from Tawny Eagle in comparable colour phase by slenderer build, narrower wings and relatively longer square-ended tail.

STATUS, DISTRIBUTION and HABITAT. Resident. Widespread but not common. West Pakistan (Baluchistan, Sind, NWFP), India from Kashmir and Punjab to W. Bengal. Assam (?); East Pakistan(?), and from c. 2400 m.

Hieraetus fasciatus



| Residential range

in the Himalayas south to Kanyakumari; Nepal. Ceylon (rare vagrant; once). Affects well wooded country, hill and plain.

Extralimital. Southern Europe south to N. Africa and east to southern China (Peters).

GENERAL HABITS. A bold and active hunter, often killing mammals and birds much heavier than itself. Either pounces on them from an ambush up in a leafy tree like the Crested Hawk-Eagle, or strikes them by aerial pursuit. The victim is killed by being gripped fiercely with both feet, the claws dug deeply in. Frequently a pair will hunt in concert, one bird swooping at and scattering a flock, e.g. of roost-bound crows, picking on an individual thus isolated for determined chase and harrying — turning and twisting after it, high and low — while its partner short-circuits the quarry by off-side tactics, both birds then sharing the spoils. Though a dashing and powerful hunter in the wild state it is considered disappointing from the falconry point of view. Pairs frequently soar and circle aloft like most raptors.

FOOD. Mainly large birds and small mammals like hares. Recorded prey includes myna, house crow, green pigeon, crow-pheasant, partridges, spur-fowl, junglefowl, pheasant, florican, houbara bustard, pond heron, painted stork, kite and other raptors. Wounded or disabled waterfowl as large as Greylag goose (*Anser anser*) are frequently carried off with great audacity from almost under the sportsman's nose. Crows are at all times a favourite food item. Occasionally becomes a scourge to domestic poultry including young turkeys, and is particularly destructive to doves and pigeons. Lizards also taken, but it seldom if ever descends to carrion-eating.

VOICE AND CALLS. Seldom heard. Described as a shrill creaking cry; a chattering *kie, kie, kikiki*.

BREEDING. *Season*, principally December and January; sometimes a couple of months later locally. *Nest*, a massive platform of sticks with a central depression lined with fresh green leaves. Added to in successive seasons, sometimes the pile assuming enormous thickness. In S. India (Kerala and the Nilgiris) built most commonly on lofty trees; elsewhere and in the Himalayas chiefly on ledges of cliffs. *Eggs*, normally 2, broad ovals, white, almost unmarked or faintly blotched with pale brown or reddish brown. Average size of 46 Indian-taken eggs 69.1×53.4 mm. (Baker). Both sexes share in nest-building, the male bringing large sticks and tangles of branches in his feet, often with green leaves adhering, the female arranging them. Incubation apparently by both, but mostly by female. Period unrecorded. Nest-feeding by both parents, the male procuring the booty, the female tearing it up and giving pieces to the small young.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from skull)	Tarsus	Tail
♂ ♂	458-520	42-49	100-104	246-266 mm.
♀ ♀	490-550	47-49	106-110	254-285 mm.
				(SA)

COLOURS OF BARE PARTS. Iris yellowish brown to orange-yellow. Bill bluish grey at base, horny black distally; cere and gape pale sulphur-yellow. Feet pale sulphur-yellow; claws horny brown.

164. **Booted Hawk-Eagle.** *Hieraaetus pennatus* (Gmelin)*Falco pennatus* Gmelin, 1788, Syst. Nat., 1(1): 272 (No type locality given)

Baker, FBI No. 1753, Vol. 5: 79

Plate 10, fig. 5, facing p. 192

LOCAL NAMES. *Baghati*, *Jumiz*, *Gilehri mār* (Hindi); *Udatal gedda* (Telugu); *Punja parandu*, *Rasali*, *Kalugu* (Tamil); *Rajaliya* (Sinhala).

SIZE. Kite —; length c. 50–54 cm. (20–22 in.).

FIELD CHARACTERS. Superficially a smaller edition of Bonelli's Hawk-Eagle, also with long feathered tarsus. In two very distinct plumage phases:

(1) Light phase. *Above*, from pale buffy or rufous-white to umber-brown, darkest (blackish) on the primaries. Top of head, nape, sides and back of neck pale rufescent buff, the feathers with darker centres. Forehead and lores buffy white; a narrow black streak running between the eyes and the lores, and similar streaks both above and below the eyes. *Below*, buffy white with blackish streaks, particularly on chin and upper breast. In overhead aspect colour pattern of light phase reminiscent of dirty white Neophron vulture with blackish band along trailing edges of wings.

(2) Dark phase. *Above*, brown with dark shaft-stripes, and whitish upper tail-coverts. *Below*, either dark brown or pale rufous with blackish streaks on breast. Tail greyish brown above, pale below, banded and tipped paler. Sexes alike; female larger.

Young (immature). More or less like (2) above. On the wing, dark and immature phases very like immature Brahminy Kite, but the relatively slenderer proportions and markedly longer and square-ended tail (*contra* rounded) usually diagnostic. Often flies with Pariah Kites in urban localities and is frequently mistaken for one; also because of its kite-like flight. But shape of tail, square-ended *v.* forked, establishes its identity.

STATUS, DISTRIBUTION and HABITAT. Partly resident; chiefly winter visitor (fairly common). Indian range practically as for Bonelli's Eagle: W. Pakistan (Baluchistan, Sind, NWFP), and all India from c. 2400 m. in the Himalayas south through the Gangetic Plain and Deccan to Kanyakumari. Nepal; Ceylon (occasional in winter). Not specifically recorded in Assam or E. Pakistan, but doubtless occurs. Affects well-wooded country, hill and plain. Commonly also semi-desert with *Dalbergia* and other forest plantations, and groves of trees around human habitations or within cultivation.

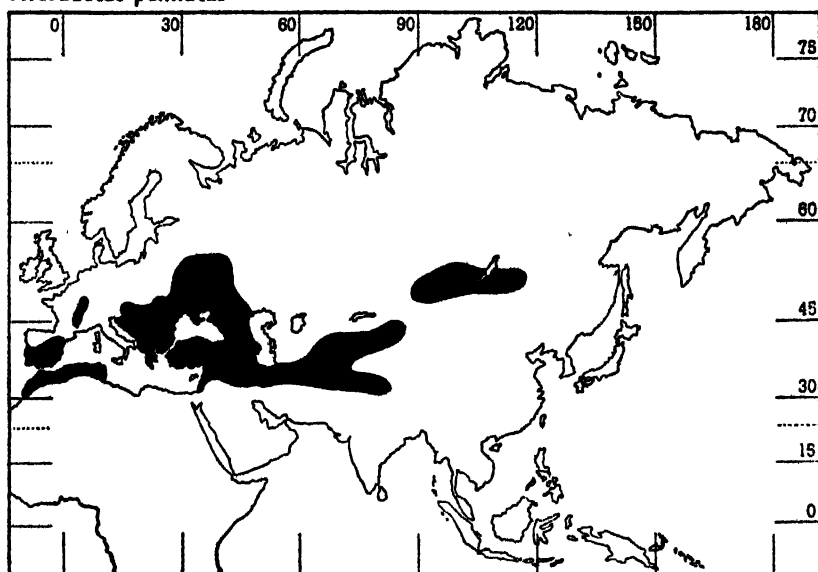
Extralimital. 'Breeds in the Iberian Peninsula, S. France, SE. Europe and S. Russia east to S. Transbaikalia, south to N. Africa and India. Winters chiefly in India and NE. Africa' (Peters). Also Burma and Malay Peninsula.

GENERAL HABITS. The smallest of our 'stockinged' eagles. Though superficially a miniature of Bonelli's at rest, its flight is much more like a kite's, light and wavering, the bird constantly swerving in its course. Takes its prey on the ground or in the air, either pouncing on it from an ambush or chasing it on the wing like a falcon. Regularly hunts in couples (whence known as *Dū bārādārān* = two brothers, in Iran), the birds stooping alternately on the quarry till struck, then sharing the spoils. Collects in numbers to roost at night in groves of large leafy trees. Invariably mobbed by crows who evidently differentiate it readily from the Pariah Kites with whom it may be associating.

FOOD. Small mammals, birds and reptiles. The following specifically recorded: squirrel, rat, lark, pipit, barbet, chukor, bulbul, dove, pigeon, domestic chicken. Often becomes a serious marauder of the poultry yard.

VOICE and CALLS. 'A very harsh falcon-like cry *kik-kik-kik* oft repeated' (A. E. Jones). Very noisy in the breeding season 'with a shrill piercing call' (Donald). 'Series of calls like Himalayan Pied Woodpecker, louder, more musical and varied.' 'Striking whistling notes' while going through aerial evolutions in breeding season (Whitehead).

Hieraaetus pennatus



■ Breeding range

BREEDING. Breeds freely in NWFP. and the high Himalayas in Kashmir Himachal Pradesh, Garhwal, etc. between 1800 and 3000 m. altitude (Whitehead, Donald, Osmaston, Jones, and others). Possibly also nests sparingly and locally in peninsular India, doubtfully recorded as such in Salem in Madras State (Theobald), and circumstantially in Gujarat (SA). *Season*, c. March to June in the Himalayas. *Nest*, a platform of sticks with a central depression lined with fresh green leaves or pine or deodar needles. Built high up (25-35 m.) in a lofty chenar, deodar or pine, or in a tree growing out of a precipice. *Eggs*, normally 2, white or skim-milk blue faintly and evenly stippled and blotched with pale rusty red. The edges of the nests and ground underneath, even before the eggs hatch, are often littered with feathers and remains of doves and other victims of the eagles. Average size of 6 Indian-taken eggs 56.7×44.2 mm. (Baker). Share of the sexes in the domestic chores, and incubation period, unrecorded.

MUSEUM DIAGNOSIS

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	370-412	31-33	61-64	188-192 mm. (Baker)
		(from skull)		
♀♀	385-423	34-36	65-69	204-225 mm. (SA)

COLOURS OF BARE PARTS. Iris brown. Bill bluish grey or pale blue with black tip; cere and gape yellow. Feet dull yellow.

Genus *LOPHOTRIORCHIS* Sharpe

Lophotriorchis Sharpe, 1874, Cat. Bds. Brit. Mus., 1: 255. Type, by monotypy, *Astur kienerii* E. Geoffroy

Differs from *Spizaetus*, also with long occipital crest, in its longer wing and shorter tail. Primaries exceeding secondaries by more than length of tarsus. Tarsus long, powerful, fully feathered. Claws exceptionally long and curved; that of 3rd toe exceeding length of culmen, excluding cere.

The genus contains one Indo-Malayan and one S. American species.

165. **Rufousbellied Hawk-Eagle.** *Lophotriorchis kienerii kienerii*
(E. Geoffroy)

Astur Kienerii G. S. (= E. Geoffroy), 1835, Mag. Zool., cl. 2, pl. 35 (Himalayas)
Baker, FBI No. 1754, Vol. 5: 80

Plate 12, fig. 7, facing p. 224 and plate 15, fig. 1, facing p. 272

LOCAL NAMES. None recorded.

SIZE. Kite \pm ; length c. 53-61 cm. (21-24 in.).

FIELD CHARACTERS. A handsome slender eagle with a distinct occipital crest as in 161, but shorter. *Above*, including crown, crest, and sides of head glossy black. *Below*, chin, throat and upper breast white with long black stripes. Rest of underparts deep rufous-chestnut, streaked with black on abdomen and flanks. In flight a large pale brownish patch (secondaries) on upper side of wing conspicuous. In overhead aspect the long wings and comparatively short tail give it the look of a large falcon, but pale grey underside of wings and tail, contrasting with white breast and rich ferruginous abdomen, are diagnostic points. Sexes alike; female larger.

Young (immature). *Above*, brown, the feathers dark centred. A line across forehead, and broad supercilium white. Tail dark brown, tipped paler and broadly barred with grey. *Below*, white, sparsely streaked with black.

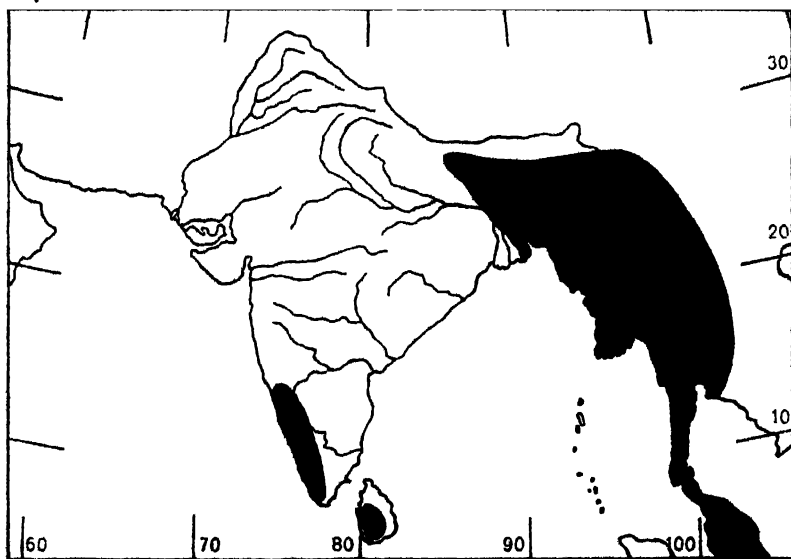
STATUS, DISTRIBUTION and HABITAT. Resident. With a curiously discontinuous Indo-Malayan distribution; Eastern Himalayas from (Nepal?), Sikkim to E. Assam, Manipur, E. Pakistan; the Western Ghats strip in south India from c. Goa and N. Mysore through Kerala, and Ceylon (all zones). Absent in the intervening country. Affects evergreen and moist deciduous forest biotope; occasionally lowlands (Ceylon), but chiefly foot-

hills and up to c. 1500 m. altitude in the E. Himalayas, and to c. 1200 m. in SW. India.

Extralimital. Burma, Thailand (?), Malay Peninsula.

GENERAL HABITS. A forest eagle, usually seen soaring or flying with rapid falcon-like wing-beats above the tree-tops on forest-clad hillsides or over wooded valleys. Or it may perch bolt upright and alert on a horizontal bough up in the foliage canopy of some lofty tree overlooking a glade or clearing, watching for prey venturing into the open. From this ambush it pounces on its quarry, killing it on the ground, or striking in the air before the victim has time to get properly under way by a thunderbolt stoop reminiscent of a peregrine falcon.

Lophotriorchis kienerii



Residential range

FOOD. Chiefly large birds and small mammals. Kaleej pheasants, jungle-fowl, spurfowl, wood partridge, green pigeon, squirrel have been specifically recorded. Destructive to domestic pigeons and poultry in forest habitations.

VOICE and CALLS. Various described as 'a plaintive scream not unlike a kite's' (Baker), 'a piercing scream' (H. C. Smith) and 'a wild resounding call' (H. Stevens). Normally silent.

BREEDING. Very little data concerning the northern population, and apparently no nest ever taken. Better known in Kerala where it breeds at elevations between 300 and 1200 m., principally 500 to 900. *Season*, c. December to March. *Nest*, a large platform of sticks, some often with green leaves still attached, the central depression lined with green leaves which are frequently renewed during incubation. Built high up (24–30 m.) in a tall tree in dense forest. As with some other raptors it occasionally has two nests at varying distances from each other, used in successive or alternate seasons. *Egg*, a singleton, broad oval, white, almost unmarked or densely

blotched with pale reddish brown primary and lavender-grey secondary markings. Average size of 19 eggs 61.2×48.1 mm. (Baker). Share of sexes in the domestic chores, and incubation period, unrecorded. The birds are said to be fierce in defence of their nest and eggs.

MUSEUM DIAGNOSIS. Owing to inadequate comparative material it is uncertain whether the populations in the north and south are identical, as presumed.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	c. 380	c. 33-35	c. 76	c. 204 mm.
♀♀	405-433	35-37	79-82	228-242 mm. (Baker)

COLOURS OF BARE PARTS. Iris dark brown. Bill plumbeous grey, black at tip; cere yellow. Legs and feet dull yellow.

Genus AQUILA Brisson

Aquila Brisson, 1760, Orn., 1: 28, 419. Type, by tautonymy, *Aquila* Brisson = *Falco chrysaetos* Linnaeus

Large and powerful raptors. Bill strong, rather long and curved from the cere; margins of upper mandible straight or with a very slight festoon. Wings long; 4th and 5th primaries (as.) longest; first primary generally more or less equal to 8th. Tail moderate; slightly rounded or almost square-ended. Tarsus feathered to toes; claws curved, strong and sharp, the hind toe and claw especially powerful.

The genus is found throughout Europe, Asia and N. America. Represented in our area by six species.

Key to the Species

	Page
A Nostrils elliptical or ear-shaped, higher than broad.....	1
B Nostrils round, as high as broad.....	2
1 Claws very large; hind claw over 50 mm.....	a
Claws moderate; hind claw under 50 mm.....	b
a Base of tail white.....	<i>A. chrysaetos</i> (juv.) 273
Base of tail not white.....	<i>A. chrysaetos</i> (ad.) 273
b Wing ♂ under 530 mm., ♀ under 575 mm.....	I
Wing ♂ over 530 mm., ♀ over 600 mm.....	II
I Barring on tail faint or lacking.....	<i>A. rapax</i> (ad.) 276
Barring on tail conspicuous.....	<i>A. rapax</i> (juv.) 276
II Plumage deep brown; crown and nape tawny....	<i>A. heliaca</i> (ad.) 274
Plumage pale umber brown.....	a ¹
a ¹ Underparts striated.....	<i>A. heliaca</i> (juv.) 274
Underparts not striated.....	a ²
a ² Edges of secondary wing-coverts narrowly tipped paler or not at all.....	<i>A. nipalensis</i> (ad.) 278
Edges of secondary wing-coverts widely tipped paler....	<i>A. nipalensis</i> (juv.) 278
2 Longest primary extending 70-80 mm. beyond seventh.....	c
Longest primary extending 80-90 mm. beyond seventh.....	d
c Upperparts dark chocolate-brown, underparts streaked with paler	<i>A. clanga</i> (ad.) 279

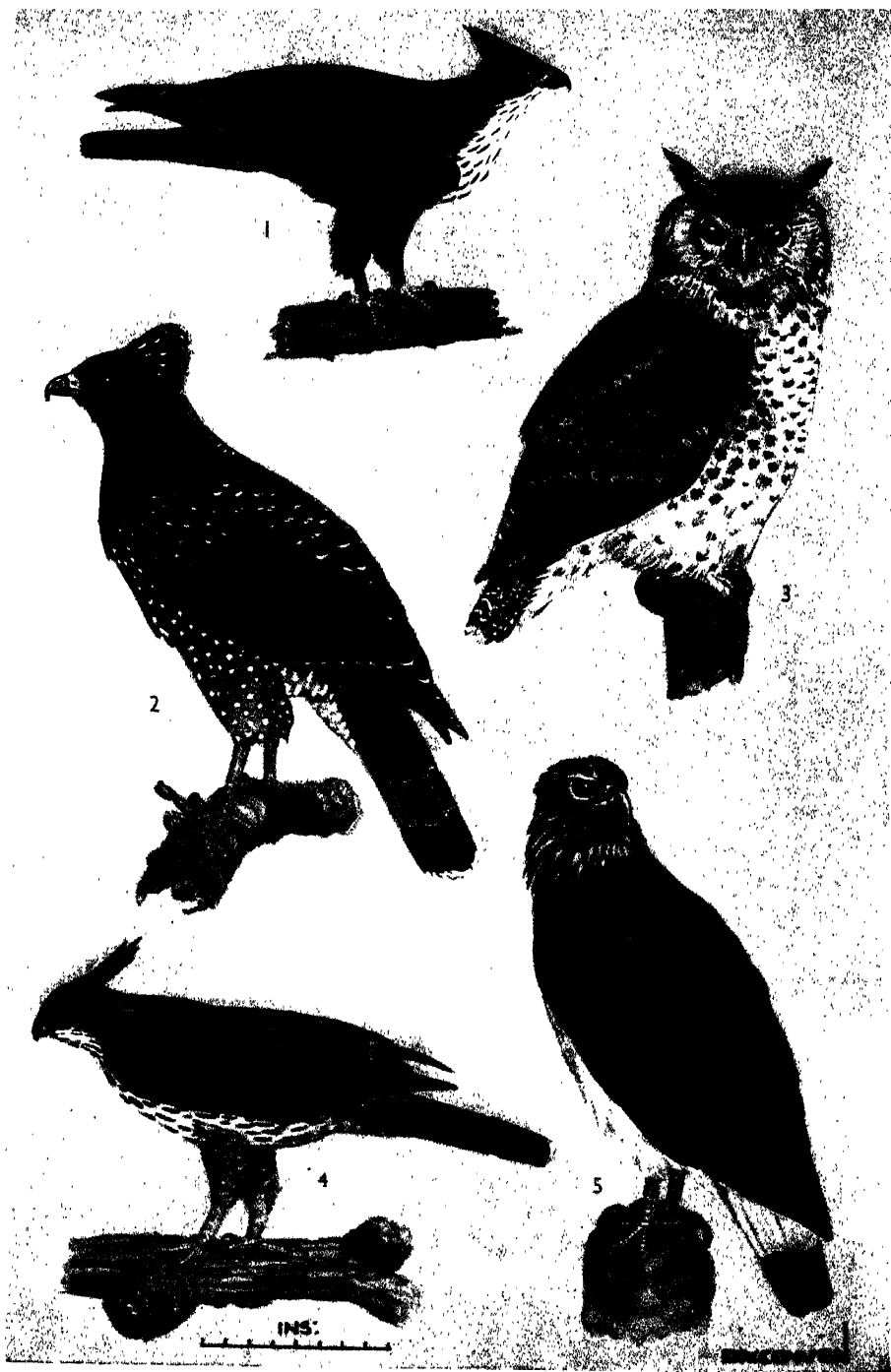


PLATE 15

1. *Lophotriorchis k. kienerii*, Rufousbellied Hawk-Eagle (165). 2. *Spilornis c. melanotis*, Crested Serpent Eagle (197). 3. *Bubo n. nipalensis*, Forest Eagle-Owl (628). 4. *Spizaetus c. cirrhatus*, Crested Hawk-Eagle (111). 5. *Ichthyophaga i. ichthyaeus*, Greyheaded Fishing Eagle (175).

	Page.
Upperparts heavily spotted with white; underparts contrastingly streaked with chocolate and pale rufous..... <i>A. clanga</i> (juv.)	279
d Unspotted and unstreaked above and below..... <i>A. pomarina</i> (ad.)	281
Underparts narrowly streaked and upperparts faintly spotted.... <i>A. pomarina</i> (juv.)	281

166. **Himalayan Golden Eagle.** *Aquila chrysaetos daphanea* Severtzov

Aquila daphanea Severtzov, 1888, Nouv. Mém. Soc. Imp. Nat. Moscou, 15 (livr. 5) : 190 (Russian Turkestan, Mongolia, Himalayas, Transbaikalia and Ala-shan Mountains)

Baker, FBI No. 1746, Vol. 5: 68

Plate 14, fig. 7, facing p. 256

LOCAL NAMES. *Mūridri* (Chamba); *Dhungshoorish* (= 'monal tiger' or monal killer — Bashahr, Himachal Pradesh).

SIZE. Vulture \pm ; length *c.* 90–100 cm. (*c.* 35–40 in.).

FIELD CHARACTERS. A very large and powerful eagle, deep chocolate-brown (almost black) with golden or tawny-rufous hindcrown, nape and hindneck. Thighs, upper and under tail-coverts, and shoulders of wings rufous-brown. Sexes alike; female larger.

In soaring overhead flight the broad wings, held in a wide open V slightly above line of back (as in King Vulture and Black Eagle) and ending in upturned widely splayed 'fingers', make it distinctive. Confusion possible with adult Imperial Eagle (167) as when flying in high wind the white bases of scapulars and back feathers may show up like the irregular white marks on back of Imperial; but rufous-buff feathers on hindcrown and nape of Golden are usually suggestive of its identity. Also tail relatively longer, and wings narrower than in Imperial.

Young (immature). Glossy brownish black with tawny head and neck. In flight a white moon-shaped patch in centre of wings both above and below (bases of primaries), and white tail with broad blackish terminal band, are revealing features. No confusion possible with young Imperial Eagle which has a brown lined plumage, much lighter below.

STATUS, DISTRIBUTION and HABITAT. Resident. Baluchistan and the Himalayas from W. Pakistan (NWF. Province) to eastern Assam (including Nepal), from *c.* 1850 metres altitude to summer snowline, *c.* 3000–5500 m. Affects desolate, rugged high mountain country with crags and precipices, and sparse stunted vegetation. Unlikely to be found near any hill-station.

Extralimital. Turkestan and E. Persia to C. Asia, south to the Himalayas (Peters).

GENERAL HABITS. In its typical Himalayan habitat perhaps less uncommon than generally supposed. Pairs hold sway over enormous territories, occupying them throughout the year for many years in succession — almost traditionally. Flight direct and seemingly unhurried, with powerful wing-beats and long glides. Method of hunting very falcon-like. Sometimes chases its quarry with speed and determination, but usually stops at it from a height at terrific velocity, striking with the huge hindclaw and vir-

tually splitting open the largest prey. Pairs often hunt in concert, one bird driving and harrying the quarry while its mate stoops from above and strikes. Circles aloft singly or in pairs, and in breeding season indulges in the spectacular stooping and nose-diving displays common to many of its lesser relatives.

FOOD. Mainly game birds and mammals, of which the following specifically recorded: pigeon, chukor, snowcock, monal and other pheasants; nest young fed predominantly on crows, chiefly *Corvus macrorhynchos*. Also kills foxes, marmots, pine martens, hares, flying squirrels (*Petaurista* spp.), young bharal (*Naemorhaedus*), and fawns of musk deer (*Moschus*). Occasionally new-born lambs of domestic sheep and full-grown tahr (*Hemitragus*), the latter attacked on the edge of a cliff and hurtled to its death below (C. H. Donald). Hardly ever carrion.

VOICE and CALLS. Normally very silent. A thin shrill yelp as of a dog, and 'barking cries' have been described.

BREEDING. *Season*, principally January to March; somewhat later at higher altitudes than at lower. *Nest*, a huge platform of sticks on a ledge of a cliff, but more usually in a deodar, juniper or such-like tree overhanging a steep precipice or growing out of a cliff-face in difficult and fearsome situations. *Eggs*, almost invariably 2, white, marked with fairly large blotches, and freckles and spots of light reddish brown. One of the pair usually more darkly marked, the pale one with very faint lavender secondary markings. Average size of 10 Indian-taken eggs 77.1×61.7 mm. (Baker). Share of the sexes in the domestic chores and other details unrecorded in India. In Europe incubation mostly by female; period in wild state estimated as c. 40 days (Witherby).

MUSEUM DIAGNOSIS. Primaries exceed secondaries by more than length of tarsus; in closed wing reach to within 3 cm. of tail-tip. Nostril elliptical, higher than broad. Hind claw much curved, enormous, over 63 cm. round curve (*vide* Donald). For detailed description of plumage and structure see Witherby 1939, 3: 41-2 for nominate race, from which *A. c. daphanea* differs only in being somewhat larger and paler.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♂	630-655	53-56	89-95	315-335 mm.
♀ ♀	660-700	58-60	95-105	350-365 mm.
				(Baker)

COLOURS OF BARE PARTS. Iris dark brown; eyelids yellow. Bill dark horn or bluish horn, black at tip; cere yellow. Feet yellow; claws horny black.

167. **Imperial Eagle.** *Aquila heliaca heliaca* Savigny

Aquila heliaca Savigny, 1809, Descr. Egypte, Ois., 82, pl. 12 (Upper Egypt)

Baker, FBI No. 1747, Vol. 5: 69

Plate 14, fig. 8, facing p. 256

LOCAL NAMES. *Jūmiz*, *Bādā jūmiz*, *Satangal* (Hindi); *Frus* (Bengal).

SIZE. Vulture -- ; length c. 81-90 cm. (32-35 in.).

FIELD CHARACTERS. Adult, deep glossy blackish brown with paler (tawny-buff to whitish) head and neck. Tail with mottled bands of grey and brown, tipped whitish and with a broad blackish subterminal band. Irregular white marks on back (scapulars). Vent and under tail-coverts dull buff. Sexes alike; female larger.

Confusable with adult Golden Eagle, q.v., but head much paler. At one stage of plumage — dark chocolate with golden whitish head — reminiscent of colour pattern of immature Marsh Harrier. In flight the relatively shorter, less protruding tail and broader wings (held in line with body not in flat V above it) are suggestive pointers.

Young (immature). *Above*, light to dark brown, feathers of head and nape with paler edges. Upper tail-coverts whitish. Tail light brown tipped with fulvous, with pale bars towards base. *Below*, always conspicuously paler and lineated or streaked, i.e. with lines of darker brown spots running down entire underside.

Confusion of immature possible with adult Steppe and Tawny, but its lineated or streaked underparts diagnostic.

STATUS, DISTRIBUTION and HABITAT. Rare resident (?), but mainly winter visitor. W. Pakistan (Baluchistan, Sind, NWFP), N. and NW. India (Kashmir, Himachal Pradesh, Nepal) south to Gujarat (Kutch, Saurashtra). How much further east and south uncertain due to records being vitiated by confusion in field identifications. Affects open treeless country.

Extralimital. 'S. Europe from Hungary to S. Russia, thence eastward to Lake Baikal; south to Greece, Cyprus, Asia Minor, N. India, and China. South in winter to Sudan and Somaliland, India, and SE. China' (Peters).

MIGRATION. Absent in the Himalayas (NWFP, Kashmir, Himachal Pradesh, etc.) and the Indian plains between March and September. Migration (evidently of this species) observed by C. H. Donald in Himachal Pradesh on 9 November 1923; many birds flying steadily and purposefully in single file c. 100 m. up, spaced out at a few minutes' interval each, in an ENE. to WSW. direction (JBNHS, 1924, 29: 1054).

GENERAL HABITS. A heavy sluggish eagle, normally seen perched for hours on end on a stump or tree-top, or on the bare ground, in open semi-desert or flat featureless country such as at the edge of the Rann of Kutch. Obtains its food by pouncing on any small animal that may show itself in its vicinity, but mostly by pirating — chasing other hawks and eagles (including Laggar Falcon) and forcing them to surrender what they have hunted. Also very largely a carrion eater, commonly seen at animal carcasses and about slaughter-houses and municipal refuse dumps. Flight slow and heavy like a vulture's.

FOOD. Apart from carrion and miscellaneous booty procured by piracy, occasionally kills rodents, reptiles and ground birds. Stomach of a specimen taken in Kutch contained a freshly swallowed Russell's Viper (*Vipera russelli*) c. 36 cm. long, and remains of a Common Sandpiper (*Tringa hypoleucos*), the latter doubtless pirated. Another held remains of two large Fat-tailed lizards (*Uromastix hardwickii*).

VOICE and CALLS. Unrecorded in India. In Europe 'a quick barking *owk-owk-owk*'.

BREEDING. In view of past misidentifications, old breeding records not completely trustworthy. The only two dependable ones, both from Punjab, seem to be (1) from Hansi (February, Blewitt), (2) from near Jhelum (April, Rattray) when the incubating females were shot and identified. The nests were large compact masses of sticks and twigs built c. 6 and 9 m. respectively up in trees. Eggs, 2 (?), generally broad ovals, dull white scantily spotted and blotched with pale lavender-grey. Average size of eight 'Indian' eggs 70.9×54.6 mm. (Baker). No other information recorded.

MUSEUM DIAGNOSIS. As in No. 166, but toes somewhat shorter and hind claw markedly so — under c. 63 mm. round curve (*vide* Donald).

MEASUREMENTS of Indian specimens

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	575–600	c. 54–55	c. 91–95	253–270 mm.
♀♀	605–630	c. 60–66	—	— (Baker)
2 ♀♀ (Gujarat)	630–632	(from skull) 60–66	102–105	284–328 mm. (SA)

A ♀ shot in Kohat weighed 8 lb. (= 3630 gm.) — Whitehead.

COLOURS OF BARE PARTS. Iris: adult, hazel or brownish yellow; immature, duller and browner. Eyeshade and eyelids yellow. Bill bluish horny, tipped blackish; cere yellow to greenish yellow. Legs and feet chrome-yellow; claws black.

168. Tawny Eagle. *Aquila rapax vindhiana* Franklin

Aquila Vindhiana Franklin, 1831, Proc. zool. Soc. Lond. pt. 1: 114

(Vindhya Hills, central India)

Baker, FBI No. 1749, Vol. 5: 72

LOCAL NAMES. *Okaab*, *Ragar* (Hindi); *Dholva* (Wagri); *Bursauul* (Yerkali); *Āldwā*, *Sāldwā* (Telugu); *Āli* (Tamil, for all eagles); *Parmar* (Sind); *Deshi jummds* (Gujarat).

SIZE. Pariah Kite +; length c. 63–71 cm. (c. 25–28 in.).

FIELD CHARACTERS. Our commonest and most widely distributed eagle in the plains. A heavy and extremely variable-coloured raptor ranging from dirty buff (almost whitish) to brownish black. Legs feathered down to toes. Tail rounded like vulture's but relatively longer. Wings long, reaching almost to tail-tip when bird at rest. Sexes alike; female larger.

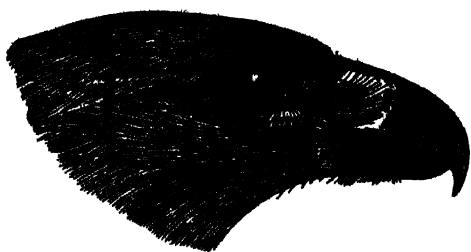
In sailing flight wings held in line with body. Easily confused with the migratory Steppe Eagle (No. 169, q.v.), especially when the two whitish wing-bars of the latter are not conspicuous.

Whether, and to what extent, colour variability due to age is uncertain. Juvenile plumages in this and other eagles impossible to study without good series of fledged juveniles of properly identified parents actually collected from nest. This is a poser for Indian ornithologists.

STATUS, DISTRIBUTION and HABITAT. Resident. W. Pakistan (Baluchistan, Sind, NWF. Province), and the drier parts of the entire Indian Union. Recorded (once ?) from Nepal. Absent in Kerala, Assam, East Pakistan

and Ceylon. Affects semi-desert and dry deciduous country, chiefly plains and plateaux.

Extralimital. North central Burma; dry parts.



× c. ½

GENERAL HABITS. Usually seen perched singly on a tree-top in the midst of ploughed fields, fallow land, or low scrub jungle. Often on the outskirts of villages at animal carcasses or scavenging at refuse dumps in association with vultures, kites, and crows, by the last of whom it is invariably chivvied. Like most eagles, performs spectacular aerobatics in the breeding season consisting of series of steep nose-dives and upsweeps. At crest of every wave, just when reversing to vertical with wings closed, utters a harsh grating *kekeke*. The display (by ♂ ?) often lasts for ten minutes or more at a time even when no mate participating. Obtains its food largely by piracy, chasing with speed and determination smaller hawks and falcons and bullying them into surrendering their lawful prize. Rarely also hunts small mammals or disabled birds. Has been observed to catch an unwounded Purple Coot (*Porphyrio*) and Florican (*Sypheotides*). On account of this pirating habit it sometimes becomes a nuisance to falconers, mistaking the jesses of a trained falcon for captured prey and chasing it till lost to sight and unrecoverable. Individuals occasionally take to habitual chicken-lifting, especially when feeding nest-young, and then become a serious menace to poultry keepers. Numbers roost collectively in groves of leafy trees in company with other raptors, e.g. Honey Buzzards.

FOOD. Small mammals, birds, and reptiles, mostly robbed from kites and other hawks; carrion and garbage. Among crop and stomach contents the following identified: Short-tailed Bandicoot (*Nasokia* sp.), Gerbille (*Meriones*), Grey Quail (*Coturnix*), Bush Quail (*Perdula*).

VOICE and CALLS. A variety of loud raucous cackles; a distinctive guttural *kra* as 'war cry' while in pursuit; a harsh grating *kekeke* in display flight. Fledged young in nest when hungry and calling for food utters loud cheeps like a two-month-old chicken separated from its mother hen.

BREEDING. *Season*, overall November to March/April, varying locally. *Nest*, a large platform of sticks and twigs, sometimes thinly lined with grass and leaves. Built at or near the top of a babool (*Acacia arabica*), kandi (*Prosopis spicigera*), sheesham (*Dalbergia sissoo*), peepul (*Ficus religiosa*) or similar tree, preferably standing by itself, often close to a village. *Eggs*, 2 or 3, white or greyish white with a few reddish brown spots and specks. Average size of 80 eggs 66.0 × 52.8 mm. (Baker). Both sexes share in nest-

building and feeding young; evidently female alone incubates and is a close sitter. Incubation period unrecorded.

MUSEUM DIAGNOSIS. Usually distinguishable from Steppe Eagle (169) by somewhat smaller size and absence of the two whitish bars on upper side of wing (tips of secondaries and greater coverts). But in borderline cases there seems to be no character by which the two can be told with certainty; hence considered conspecific by some authorities.

Chick (in down). 'Prepennae and preplumulae present — white, sparse on cere and round orbit, otherwise completely covering body. Preplumulae make up the bulk of the down. Iris bluish brown; bill dull black; cere, gape and legs yellow' (C. B. Ticehurst).

MEASUREMENTS

	Wing	Bill (from skull)	Tarsus	Tail
♂♂	500-535	c. 48-51	80-87	242-258 mm.
♀♀	510-560	48-56	84-91	242-285 mm.
				(Baker and SA)

COLOURS OF BARE PARTS. Adult. Iris yellow-brown. Bill horny black, plumbeous at base of lower mandible; cere and gape lemon-yellow. Feet yellow; claws black. (One in very pale buff plumage had the cere ivory white.)

169. Eastern Steppe Eagle. *Aquila nipalensis nipalensis* (Hodgson)

Circetus nipalensis Hodgson, 1833, *Asiat. Res.*, 18(2): 13, pl. 1 (Nepal)

Baker, FBI No. 1748, Vol. 5: 70

Plate 14, fig. 5, facing p. 256

LOCAL NAMES. *Jūmiz* (Hindi); *Cong au* (Lepcha).

SIZE. Kite +; c. 76-80 cm. (30-32 in.).

FIELD CHARACTERS. Very similar to the Tawny Eagle (168) and like it variable in coloration, ranging from deep blackish brown to pale, almost buffish brown; often with a rufous patch on nape. Usually two diagnostic pale bars on upper as well as underside of wings formed by whitish tips of secondaries and coverts. Connexion, if any, between colour phases and age not properly understood.

STATUS, DISTRIBUTION and HABITAT. Winter visitor. Common in W. Pakistan, Nepal and N. India, wandering south at least to the Bombay Deccan, east to S. Orissa (to c. 22°N. lat.). Said to occur uncommonly in Assam. E. Pakistan(?). Affects open treeless country in its breeding range; more or less the same biotope as Imperial and Tawny in its winter quarters.

Extralimital. 'Breeds from the Altai to Mongolia and SE. Siberia, south to NW. India and Himalayas[?]. Winters to India and S. China' (Peters).

MIGRATION. Donald shot one on a high pass in Bashahr (Himachal Pradesh) in October where southward migration was in progress. The 1960 Indian Mt Everest Expedition found three large eagles lying dead on the South Col c. 7925 m. (26,000 ft.) altitude on 23 May, which had obviously perished while on passage over this difficult pass. One of these was brought down to the Bombay Natural History Society and identified as this species. Another eagle, possibly also Steppe, had been found dead in the same pass

by a Swiss expedition in autumn 1952. The South Col would therefore seem to lie on one of the regular routes of this eagle across the Himalayas between its summer and winter habitats.

GENERAL HABITS. More closely resemble those of Imperial than of Tawny which usually occupies a somewhat different ecological niche—more wooded country. But the two often occur side by side in winter. Said to be more active in its hunting than Imperial; but living largely by piracy and carrion-eating.

FOOD. As in 167. Nothing specifically different recorded.

VOICE and CALLS. Unrecorded.

BREEDING. Extralimital. Its alleged occasional breeding in India requires confirmation by actually nesting specimens.

MUSEUM DIAGNOSIS. Nostrils elliptical or ear-shaped, higher than broad. Two whitish bars on upperside of wings formed by pale tips to secondaries and greater coverts. Hindclaw about same size as in Imperial (35–45 mm.) but foot smaller and weaker. Considered by some authorities conspecific with *A. rapax*, q.v.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	510–595	50–56	85–89	250–290 mm.
♀♀	602–625	56–58	—	—
				(Baker)

Tarsus of specimens in BNHS collection 2 ♂♂ 92–96; 4 o? (84) 92–98 mm.

The South Col specimen (sex ?) measured: Wing 585; bill (from skull) 55; tarsus 98; hindclaw 35; tail 290 mm.

Weight of one from Punjab 3060 gm. (Whistler).

COLOURS OF BARE PARTS. Iris hazel to dark brown. Bill black; cere deep yellow. Legs and feet dull yellow or greenish yellow to bright yellow; claws black (Baker).

170. Greater Spotted Eagle. *Aquila clanga* Pallas

Aquila Clanga Pallas, 1811, Zoogr. Rosso-Asiat., 1: 351 (Russia and Siberia)

Baker, FBI No. 1750, Vol. 5: 74

Plate 14, fig. 6, facing p. 256

LOCAL NAMES. *Kāljāngā* (Hindi); *Nālla gādlā* (Telugu).

SIZE. Kite +; length c. 64–72 cm. (c. 25–28 in.).

FIELD CHARACTERS. A very dark eagle without whitish head seen in the vicinity of a jheel is pretty certain to be an adult Greater Spotted.

Adult. *Above*, dark blackish brown with purplish or maroon reflections on mantle. Usually a little white visible in upper tail-coverts, and sometimes minute white specks on body and wings (due to white bases of feathers showing through). *Below*, slightly paler. Sexes alike; female larger.

In sailing flight wings held in line with body with the tips slightly downcurved. Two pale bands visible on upper side of wings. But indistinguishable with certainty in the field from adult Lesser Spotted except when upper tail-coverts are *pure* white; dingy white may apply to both species.

Young (immature). *Above*, dark blackish brown sometimes with paler crown and nape due to buff tips to the feathers. Back and wings sparsely

streaked and spotted with buff or white. Rump pale brown; upper tail-coverts whitish, showing up prominently in flight as a broad crescentic patch above base of tail. *Below*, dark brown broadly streaked with buff.

Separable from immature Lesser Spotted Eagle (171) by darker coloration with more pale spots and streaks on upperparts, and (usually) more distinct white crescent above base of tail.

Many confusing intermediate colour phases between the above two, presumably according to age.

STATUS, DISTRIBUTION and HABITAT. Resident and breeding in W. Pakistan (Baluchistan, Sind, Punjab) and N. India (Gangetic Plain). Nepal (lowlands), east through Bihar, W. Bengal, and Assam. Manipur; E. Pakistan. South to about 22°N. lat. (Khandesh, N. Gujarat, etc.). Wandering south in the Peninsula in winter when population augmented by influx of migrants. No recent records from the Carnatic and Malabar coasts where a hundred years ago Jerdon (1862) described it as 'tolerably common'. This change in status doubtless due, as noticeable even today, to altering ecological conditions, natural or man-made, the Greater Spotted — a predominantly water- and marsh-linked eagle — being particularly vulnerable to draining and marsh reclamation. A specimen taken at Londa, N. Mysore (15°31'N., 74°32'E., Koelz *c.* 1941), is perhaps the southernmost recent record in the Peninsula. Absent in Ceylon. Restricted to well-watered tracts; affects the neighbourhood of jheels, canals and marshes.

Extralimital. 'Breeds in European Russia from lat. 60°N. south to the Balkan States; east through Turkestan, S. Siberia and Transbaikalia to Amurland, south to NW. India and N. China. Winters south to NE. Africa, India and S. China' (Peters).

GENERAL HABITS. Keeps to well-wooded, well-watered tracts with perennial rivers, canals, swamps, and jheels. Usually perched singly on a tree-top, stump, or canal bank on the look-out for prey. Heavy movements much resemble a buzzard's. Flight less sluggish than Tawny Eagle's, and though largely a frog-eater it also actively hunts waterfowl such as coots and moorhens. The usual method with coots is first to stampede a compact herd floating on the water by swooping low over ('buzzing') it and scattering the birds. While some of the coots patter away and others dive, the eagle repeats the attack again and again until it has managed to isolate one individual. It stoops on the quarry repeatedly whenever it surfaces for breath, and after maybe a number of unsuccessful assaults pounces on it like a hurricane immediately the harassed bird breaks the surface again, and leisurely bears it away in its talons.

FOOD. The following items have been recorded: frogs (mainly), fish, chameleon, *Calotes* lizard, Purple and Indian Moorhens (*Porphyrion* and *Gallinula*), Coot (*Fulica*), Tree Pie (*Dendrocitta vagabunda*), Kingfisher (*Halcyon smyrnensis*) — complete head with bill in stomach! Frequently makes off with wildfowl falling to a sportsman's gun with great audacity.

VOICE and CALLS. A wild, clanging *jeb, jeb, jeb* (Pallas) frequently uttered from a tree-top.

BREEDING. *Season*, mainly April to June, but may begin a month or two earlier. *Nest*, the usual massive circular platform of sticks and twigs, the central depression lined with a few leaves. Normally built at or near the

top of a tree 10 to 15 metres up, standing by itself or in a clump in open marshy or pasture land. *Eggs*, 1 or 2, broad ovals, white, sometimes faintly freckled with reddish or blotched with grey or reddish grey. Average size of 72 eggs (including European) 68.3×54.1 mm. (Baker). Share of the sexes in the domestic chores, and incubation period, unrecorded.

MUSEUM DIAGNOSIS. Nostrils round; as high as broad. 7th primary (as.) usually less than 6 cm. shorter than longest. Outer web markedly narrowed and steeply notched near tip. For description of plumages etc. see Witherby 1939, 3: 45-6.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	486-501	45-50	103-106	240-260 mm.
♀♀	542-565	48-52	—	250-276 mm.
				(Baker)

It is uncertain whether extralimital birds are included above. Specimens recently collected in India measure:

		(from skull)		
2 ♂♂	485-500	47-53	85(1)	227-242 mm.
4 ♀♀	514-545	52-55	90-110	242-272 mm.
				(SA)

COLOURS OF BARE PARTS. Iris brown. Bill slaty blue, black at tip of both mandibles, paler or greenish yellow near gape; cere greenish sulphur-yellow. Feet dull sulphur-yellow; claws black.

171. Lesser Spotted Eagle. *Aquila pomarina hastata* (Lesson)

Morphnus hastatus Lesson, 1834, in Bélanger, Voy. Ind.-Orient., Zool.: 217 (Bengal)
Baker, FBI No. 1751, Vol. 5: 75

LOCAL NAMES. *Gūtimār* (= 'cocoon destroyer' in Bengal); *Pahāri teesa* (Hindi); 'Longlegged Eagle' of Jerdon.

SIZE. Kite; length c. 61-66 cm. (24-26 in.).

FIELD CHARACTERS. A large blackish brown or dark chocolate-brown eagle.

Adult. Slightly smaller but indistinguishable in the field with certainty from Greater Spotted (170). Both may have dingy white upper tail-coverts, but Lesser never has them pure white as is diagnostic of typical examples of *A. clanga*. Difference in ecology usually a more dependable guide. Greater Spotted never met away from water; Lesser normally in open wooded country.

Young (immature). Separable from immature Greater Spotted (170) by somewhat less dark coloration, with the paler spots and streaks on upper plumage smaller and fewer.

Also found in many puzzling intermediate colour stages.

STATUS, DISTRIBUTION and HABITAT. Resident. The wide range given for it in the *Fauna* and *Synopsis* appears unwarranted. Not found in W. Pakistan; rare on the western side of the Peninsula south to Bombay, as it also is in Saurashtra. In fact comparatively rare wherever it occurs, viz. chiefly the Gangetic Plain east through Bihar, W. Bengal and E. Pakistan (least uncommon); south to Madhya Pradesh and Orissa. How much further

south is uncertain since not obtained by the recent scientific bird surveys in Andhra, Madras, Mysore or Kerala. Absent in Ceylon. There is an old specimen from Kotagiri, Nilgiri Hills, from the Hume Collection in the British Museum, and another recorded as shot off a nest in Mysore by J. Davidson some 70 years ago. In Assam it occurs (*vide* Baker) north and south of the Brahmaputra river, and also in Manipur. Affects wooded country, chiefly plains, with open expanses and cultivation, *contra* the Greater Spotted which is restricted to the neighbourhood of jheels and marshes; to confound the observer, however, it is sometimes also found side by side with the latter!

Eagles are notoriously difficult birds to identify in the field, and often even in the hand, without experience and adequate comparative material. There has undoubtedly been a great deal of confusion in their identification and distributions in the past, which partly persists today. Therefore all records unsupported by specimens, except in the case of very common and well marked species, must be treated with caution.

Extralimital. N. Burma (needs confirmation).

GENERAL HABITS. Not markedly different from *A. clanga* (170) except that it is not so narrowly dependent on jheels and marshes. A courtship display of nose-dives and upsweeps — of a pattern common to many raptorial birds, e.g. Tawny Eagle q.v., has been described for the nominate race in Europe (H. Siewert 1932, *Jour. Orn.*: 9–10). Prey is largely captured on the ground while the bird saunters about in the open in its search, bill pointing intently downward. It is seized in the claws.

FOOD. Frogs, lizards, young or weakling birds, field rats and mice, etc. Apparently silkworm pupae from cocoons largely eaten in Bengal. Has been observed purposefully tearing open the globular nests of Pied Mynas (*Sturnus contra*) to get at the young. Often lives by piracy, chasing and bullying Pariah Kites into jettisoning their lawful prize.

VOICE and CALLS. 'A very high-pitched cackling laugh' (Baker). Nothing else specifically recorded.

BREEDING. *Season*, April to July, the majority of birds apparently laying in May. *Nest*, a large platform of sticks and twigs, some with leaves attached — of the typical eagle pattern. Built between c. 10 and 25 m. up in a large tree — simul (*Salmaal*ia), sal (*Shorea*), mango (*Mangifera*), peepul (*Ficus*), and such-like — either standing by itself or one of a clump in cultivated country, often near a village. *Eggs*, normally 1, sometimes 2, rarely 3. Similar to those of *A. clanga* (170) but readily distinguished by smaller size and richer marking; also resembling Tawny Eagle's, q.v. Average size of 22 eggs 63.8 × 49.8 mm. (Baker). Both sexes share in the domestic chores; the male chiefly collecting material and foraging, the female building the nest and feeding the young. Incubation by female alone; period c. 42–44 days (in nominate race *vide* Siewert). Circumstantial evidence (as yet unproven) that if disturbed at nest, e.g. by man climbing up, the bird will transfer its eggs to an alternative old nest in the vicinity.

MUSEUM DIAGNOSIS. As in *A. clanga* nostrils round; as high as broad. Differs from it by smaller size and slenderer bill, less high at base. 7th primary (as.) usually more than 6 cm. shorter than longest, with its outer web only slightly narrowed and notched near tip, *contra* in *A. clanga*, q.v.

In the race *hastata* adult similar to nominate *pomarina* though somewhat slimmer: crown and upper wing-coverts same colour as back; underside with distinct dark shaft stripes. Immatures of the two readily separable. In *hastata* crown and nape feathers only tipped with rufous (not streaked); likewise lesser wing-coverts. Upper tail-coverts distinctly cross-barred (Hartert).

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♂	470-505	40-43	100-104	230-248 mm.
♀ ♀	493-508	48-52	—	— mm.
				(Baker)

COLOURS OF RARE PARTS. Iris brown. Bill slaty blue, black at tip of both mandibles; cere and gape yellow. Feet dull yellow; claws black.

Genus *ICTINAETUS* Blyth

Ictinaetus Blyth, 1843, Jour. Asiat. Soc. Bengal, 12: 128. Type, by monotypy, *Ictinaetus ovivorus* Blyth = *Aquila pernigra* Hodgson

Tarsi feathered to toes. Shape of foot peculiar and diagnostic. Outer toe and claw very small. The other toes also short, inner toe stouter, but nearly equal in length to middle toe. Claws less strongly curved than in other genera of eagles. Inner claw longest, longer even than hind claw. Bill rather small; edge of upper mandible almost straight. Nostrils broadly oval and oblique. Wing long; 5th or 6th primary (as.) longest; first primary a little longer than secondaries. Tail long, somewhat rounded.

The genus contains a single Indo-Malayan species.



x c. $\frac{1}{2}$

172. **Black Eagle.** *Ictinaetus malayensis perniger* (Hodgson)

Aquila Pernigra Hodgson, 1836, Jour. Asiat. Soc. Bengal, 5: 227 (Nepal)
Baker, FBI No. 1755, Vol. 5: 83

Plate 17, fig. 6, facing p. 320

LOCAL NAMES. *Laknanghang* (Lepcha); *Hugong* (Nepal); *Ādāvi nālla gāddā* (Telugu); *Kāzhūgū* (Tamil); *Daoling gashim* (Cachari); *Karimparundu* (Malayalam).

SIZE. Kite +; length c. 69-81 cm. (27-32 in.).

FIELD CHARACTERS. A large black eagle, with wings reaching to end of tail at rest. Superficially confusable with melanistic form of *Changeable*

Hawk-Eagle (160), but its much broader wings are a leading clue. Mostly seen in flight when black plumage, narrowly grey-barred tail — longer than most eagles' — and bright yellow cere and feet are diagnostic. Wings very long and broad with rounded tip and exceptionally widely splayed and upturned primaries. Sexes alike; female larger.

At a distance, in sailing flight, outlines reminiscent of Golden Eagle — broad wings held in a wide V above line of back. When overhead a pale patch on dark underside of wings conspicuous, as also is, at close range, a white patch under the eye.

Young (immature). *Above*, paler brown stippled with buffy brown on head, nape, and neck. Upper tail-coverts fringed with white. *Below*, throat and breast with oval drops of fulvous-brown. Abdomen and flanks dark-streaked.

STATUS, DISTRIBUTION and HABITAT. Resident. Widely but patchily distributed in evergreen and moist deciduous forest biotope; foothills and up to c. 2700 metres altitude in the Himalayas, and c. 2000 m. in the peninsular hills. From W. Pakistan (Murree, Rawalpindi dist.), through Himachal Pradesh and Nepal to E. Assam, E. Pakistan (?), W. Bengal, Orissa, E. Ghats in Andhra and Madras (including Shevaroy Hills), Madhya Pradesh (Hoshangabad and Bastar dists.). Ceylon and the W. Ghats strip from Kanyakumari northward at least to Goa and N. Mysore (including the Nilgiri and Palni Hills). Well documented sight records from Gujarat (Jambughoda, c. 22°26'N., 73°48'E.) and from within a 50 km. radius of Bombay City.

Extralimital. Burma (Chin Hills and Tenasserim), Thailand, Malay Peninsula. The somewhat smaller nominate race occurs in Java, Sumatra, Borneo, Celebes, and Sula Islands.

GENERAL HABITS. Partial to hill forest. Usually seen in pairs sailing gracefully and effortlessly on the enormous outspread wings within a foot or two above the forest canopy or gliding expertly in and out among the boles and foliage of the lofty trees, side-slipping and diving to avoid obstructions. The exceptionally widely splayed and upturned primaries function as ailerons and enable sailing at very low air speeds over and through the tree-tops while methodically searching for birds' nests — eggs and nestling birds forming an important part of its dietary. It has been observed flying off with entire nests of small birds in its claws examining the contents while sailing lazily away. The peculiar foot is believed to have some adaptive significance for nest robbing. Nearer the ground its hunting is very much like a harrier's — sailing on motionless wings up and down along the contours of a grassy hillside, peering intently below for movement, checking suddenly and turning upon itself when opportunity offers, and dropping into the grass to seize the quarry.

In the breeding season pairs indulge in impressive aerial displays, plunging with wings held down and forward, circling round each other and mutually stooping with wings folded to tail-tip, at astounding velocity. These manoeuvres are accompanied by shrill yelping cries.

FOOD. Large insects, frogs, lizards, rodents, birds — sometimes reportedly kills junglefowl and pheasants. But chiefly birds' eggs and nestlings. Among crop and stomach contents specifically recorded are: nestlings and incubated

eggs of *Garrulax* spp., eggs of *Perdica erythrorhynchos*, *Turdoides* spp., *Streptopelia* spp., small bats (sp. ?) and in one case 'six or more young field mice'.

VOICE and CALLS. Normally silent. Apart from the shrill yelping cries uttered during aerial display, nothing recorded.

BREEDING. *Season*, mainly November to March in South India; apparently between January and April in the north. Curiously enough nesting not yet recorded in Ceylon. *Nest*, a rather neat and compact platform of sticks and twigs lined with green leaves. Built high up in a lofty tree in evergreen hill forest between c. 300 and 1200 metres altitude, usually hidden by the foliage. As in several other eagles, e.g. *Lophotriorchis* (165), sometimes has two alternate nests, a short distance from each other, repaired and used irregularly in successive years. *Eggs*, normally a singleton, very rarely 2, broad oval in shape, handsome and variable in coloration. Most commonly whitish or pinkish in ground colour, finely and densely stippled with pale brick-red. Average size of 22 eggs 62.7×49.9 mm. (Baker). Although usually keeping in pairs and seemingly paired for life, if one bird is killed the survivor secures a new mate within a surprisingly short time. Share of the sexes in the nesting activities, period of incubation and other details unrecorded.

MUSEUM DIAGNOSIS. As for the genus. A whitish area, including upper throat, from base of bill to around eyes and behind ear-coverts. Chin and gular stripe black.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	520-523	37-38	69-73	285-312 mm.
♀♀	538-568	—	—	(Baker)

It is clear that Baker's measurements (above) refer only to the smaller South Indian and/or Ceylon birds. Specimens from Ceylon in the British Museum give:

	Wing	Bill from feathers	from cere	Tail
2 ♂♂	543, 547	40, 40.5	30, 30	303, 307 mm.
1 ♀	558	43	33	312 mm.
2 ♂?	522, 538	39, 40.5	28.5, 30	295 (1) mm. (Biswas)

As against this 4 specimens recently collected by Biswas in Nepal measure:

		(from skull)		
3 ♂♂	563-580	40-43	—	315-326 mm.
1 ♀	600	46	—	350 mm.

and 4 specimens from Sikkim Himalayas measured by H. Stevens:

2 ♂♂	572-576 mm.
2 ♀♀	580-585 mm.

COLOURS OF BARE PARTS. Iris dark brown. Bill greenish- or plumbeous-horny with black tip; cere and gape yellow. Legs yellow; claws black.

Genus HALIAEETUS Savigny

Haliaeetus Savigny, 1809, Descr. Egypte, Ois., 1: 68, 85. Type, by monotypy, *Haliaeetus nisus* Savigny = *Falco albicilla* Linnaeus

Bill stout; culmen straight at base, then greatly curved; festoon generally well marked but variable. Nostrils rounded. Wings very broad; primaries comparatively

little longer than secondaries. 3rd primary (aa.) longest; 4th and 5th only slightly shorter. Tail rounded or wedge-shaped. Tarsus stout, moderately long; $1/8$ to $1/4$ feathered in front; rest scutellated in front and on toes, reticulated elsewhere. Claws grooved underneath.

Genus almost cosmopolitan but absent in S. America. Three species in the Oriental Region.

Key to the Species

		Page
A	Tail all white. <i>H. albicilla</i> (ad.)	286
B	Tail brown with white end. <i>H. leucogaster</i> (ad.)	287
C	Tail brown with a white cross-band. <i>H. leucoryphus</i> (ad.)	289
D	Tail variegated and mottled brown and white. 1	
1	Head nearly always lighter than back. <i>H. leucogaster</i> (juv.)	287
	Head and back similar in colour. a	
a	Feathers of breast lanceolate but no ruff. <i>H. albicilla</i> (juv.)	286
	Feathers of breast lanceolate with distinct ruff. ?	
 <i>H. leucoryphus</i> (juv.)	289

172a. Whitetailed Sea Eagle. *Haliaeetus albicilla* (Linnaeus)

Falco albicilla Linnaeus, 1758, Syst. Nat., ed. 10, 1: 89 (Sweden)

Baker, FBI No. 1777, Vol. 5: 110

LOCAL NAMES. None recorded.

SIZE. Kite +; length c. 69–86 cm. (27–34 in.).

FIELD CHARACTERS. A huge dark brown eagle with paler (whitish) head, neck and upper breast, and shortish distinctive white wedge-shaped tail. Sexes alike; female larger.

In overhead aspect the very broad wings, and comparatively short tail give a vulture-like appearance, but shape and colour of tail diagnostic.

Young (immature). Variable dark brown. Pale fulvous bases of feathers showing through, especially on underparts which look fulvous broadly streaked with dark brown. Tail mottled and edged with brown.

STATUS, DISTRIBUTION and HABITAT. Rare casual winter visitor to West Pakistan (Baluchistan, Sind, NWF. Province). Only a single reliable record in India — from Punjab (Kulu, Donald). Essentially a sea eagle, but wandering from the coast up large rivers and to jheels and inundations inland.

Extralimital. 'Breeds in Greenland, Iceland, northern British Isles (formerly), N. Europe and Asia east to Anadyr and Kamchatka south to the eastern Mediterranean (formerly Egypt and the Red Sea), Iraq, Iran, and Japan. Casually or in winter to N. Africa, NW. India, S. China and Aleutian Islands' (Peters).

GENERAL HABITS. Sluggish. Will sit hunched up and inert for hours together on a stump or on ground at edge of water. Lives largely on fish which is scooped up in its talons from near the surface while sailing close above water; only rarely by plunging. But will also take duck and small mammals on occasion; and carrion. One has been recorded frequenting a rubbish dump near Quetta Cantonment.

VOICE and CALLS. Unrecorded in India.

BREEDING. Extralimital.

MUSEUM DIAGNOSIS. Feathers of hindneck and breast long lanceolate, but not forming a ruff as in *H. leucoryphus*. Upper tail-coverts very long and broad. For details of plumages, structure, etc. see Witherby 1939, 3: 93-5.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	593-632	c. 61	c. 85	285-325 mm.
♀♀	640-686	c. 65	—	318-352 mm. (Baker)

COLOURS OF BARE PARTS. Iris, adult yellow, imm. brown. Bill and cere yellow; more brown in young birds, and quite blackish brown in the youngest. Feet yellow (Baker).

173. **Whitebellied Sea Eagle.** *Haliaeetus leucogaster* (Gmelin)

Falco leucogaster Gmelin, 1788, Syst. Nat., 1(1): 257

(Prince's Island, Indonesia, designated by Stresemann, 1950, Auk, 67: 82)

Baker, FBI No. 1778, Vol. 5: 111

Plate 14, fig. 2, facing p. 256

LOCAL NAMES. *Kohassa* (Hindi); *Sāmp mār* (in Orissa); *Āla gūddā* (Telugu); *Kāddāl āli* (Tamil); *Muhudu rajaliya* (Sinhala); *Kānkan* (Kanara and Konkan); *Muttayeya* (in Car Nicobar). Greybacked Sea Eagle of Jerdon.

SIZE. Kite+; length c. 66-71 cm. (26-28 in.).

FIELD CHARACTERS. A large, handsome eagle, ashy brown above with pure white head, neck, underparts, and terminal third of tail. Sexes alike; female larger.

In overhead aspect the broad blackish border on trailing edge of white underwing, and white wedge-shaped tail, are diagnostic features. In sailing flight wings held in a wide V above line of back. At rest, closed wings reach end of tail or a little beyond.

Young (immature). Dark brown with head and neck fulvous (almost whitish). Wedge-shaped tail white or whitish, with the terminal portion brown but pale tipped. Upper breast brown; rest of underparts fulvous or rufous-white, mixed with brown.

STATUS, DISTRIBUTION and HABITAT. Resident. The seaboard and offshore islands from about the latitude of Bombay (c. 19°N.) down the west coast and up the east to E. Pakistan. Laccadive Is., Ceylon, Andaman and Nicobar Islands. Affects sea coast, and tidal creeks and estuaries. Occasionally met a few miles inland along tidal rivers and at freshwater lakes. A vagrant in Gujarat, one recorded near Ahmedabad c. 80 km. inland from sea coast, and another at the mouth of Shatrunji river, Saurashtra.

Extralimital. Coasts of Burma, Malay Peninsula and Archipelago east to Australia, Tasmania and W. Polynesia (Peters).

GENERAL HABITS. Usually seen in pairs or singly, perched upright on a fishing stake or islanded rock or tall tree overlooking the sea, or sailing majestically along the shoreline beyond the surf zone. From a height of

15 or 20 metres, with wings pulled in, a bird will stoop at tremendous speed and cleanly pick up in its stride a sea snake or fish from near the surface, its feet seeming hardly to touch the water before it deftly rises again with the quarry dangling from its talons. It is carried to a favourite branch or rock — bestrewn with bones of sea snakes and fish and whitened with evidences of numerous past meals—and torn to pieces and devoured. Does not plunge for fish like osprey. In the non-breeding season the old nest frequently serves as dining table, larder, and refuse dump, the leavings providing an excellent index to the ornithologist of the food items and their abundance at any particular time and place. In courtship, pairs indulge in the same pattern of aerobatics common to many birds of prey — stooping playfully, somersaulting, side-slipping, looping-the-loop and similar antics. Pairs keep together throughout the year, and roost on or near the traditional nest tree.

FOOD. Predominantly sea snakes (Hydrophiinae); largely also fish, some of considerable size. Reported to take crabs, rats, and any living thing it can catch, besides dead fish cast overboard from fishing boats. When feeding nest-young occasionally becomes a serious chicken robber near fishing villages; once recorded carrying off a domestic duck.

VOICE and CALLS. Very noisy during breeding season. At this time, particularly just prior to copulation, the female utters a loud, nasal, metallic *kānk-kānk-kānk-kānk*, etc. the male responding with a shorter quick-repeated *ken-ken-ken-ken*, etc. (up to ten times) and continued for over three minutes or more with short breaks; this in an uneven duet. Female also utters *kānk-kānk-kānk* during copulation, now rather long drawn and slower in tempo, ending up ecstatically as in young koel (*Eudynamys*) receiving food from fosterer. Whether calls of male and female different, or common but dependent on context and occasion, uncertain. A single loud nasal clang also uttered from time to time reminiscent of Black Ibis's call (*Pseudibis papillosus*), but louder.

BREEDING. *Season*, October to January. *Nest*, an enormous platform of sticks and twigs, often 1.25 to 1.50 metres across and some 50 to 75 cm. thick, the result of repairs and annual accretions. Placed 10 to 50 metres up in lofty trees such as casuarina growing on the coast or on an off-shore islet; sometimes directly on a rocky stack in the sea. Usually a single pair with a vast territory, but not uncommonly several pairs and nests on the same small island. The same nest and site are used year after year, sometimes becoming traditional and legendary, and occupied by 'the same' pair for 50 years and more. It is not known how the tenancy of a nest passes from one pair to its successor when the need arises. Nor where the young disperse after fledging, since local populations do not show any appreciable fluctuation. Evidently infertility in eggs is high and mortality among nestlings heavy. *Eggs*, almost invariably 2, broad to longish white ovals, unmarked. Average size of 32 eggs 77.7×53.4 mm. (Baker). Both sexes share in

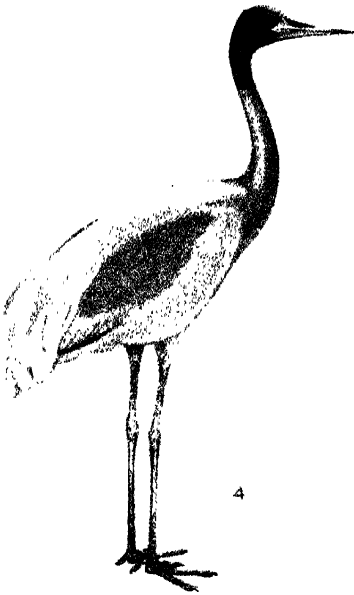
PLATE 16

1 *Buceros b. hamrai*, Great Pied Hornbill (776). 2 *Torgos calvus*, Black Vulture (178). 3 *Gyps i. tenuirostris*, Indian Longbilled Vulture (184). 4 *Grus a. sharpii*, Sarus Crane (324). 5 *Pavo m. spicifer*, Burmese Peafowl (312) ♂. 6 *Gyps bengalensis*, Indian Whitebacked Vulture (185). 7 *Argusianus argus*, Argus Pheasant (SE) ♂.



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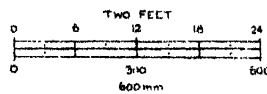


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7

Antony
1929.



building and repairing the nest; apparently the male does some of the incubating as well. Period unrecorded.

MUSEUM DIAGNOSIS. No lanceolate feathers on breast or hindneck. Legs exceptionally powerful. Adult: tail brown with broad white ending. Immature: tail variegated and mottled brown and white. Head nearly always lighter than back.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♂	526-589	c. 48-55	c. 92-99	208-260 mm. (Baker)
♀ ♀	588-606			

COLOURS OF BARE PARTS. Iris hazel-brown. Bill dark leaden; cere paler bluish grey. Legs and feet pale yellowish white to greyish white; claws darker.

174. Ringtailed or Pallas's Fishing Eagle. *Haliaeetus leucoryphus*
(Pallas)

Aquila leucorypha Pallas, 1771, Reise Versch. Prov. Russ. Reichs, 1: 454
(Lower Ural river)

Baker, FBI No. 1779, Vol. 5: 112

Plate 11, fig. 4, facing p. 208

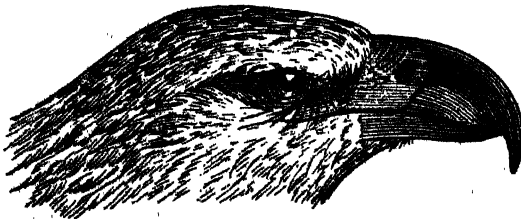
LOCAL NAMES. *Machharang*, *Machhmanga*, *Dhēnk*, *Patras* (Hindi); *Koral*, *Machhal* (Bengal); *Kānkam* (Nepal); *Kural haaz* (Sind); *Kokna*, *Ugus* (C. India and on the Ganga at Rajmahal); *Sorail*, *Kootair* (local in Bihar).

SIZE. Kite+; length c. 76-84 cm. (c. 30-33 in.).

FIELD CHARACTERS. A large dark brown eagle with pale golden brown head and neck, and a broad white subterminal band across rounded (not wedged-shaped) tail, particularly conspicuous in flight though tail seldom spread out, and appearing rather narrow. Sexes alike; female slightly larger.

When sailing, wings held in same plane as body, the tips of the primaries slightly downcurved.

Young (immature). Dark brown, the wing quills and tail (unbanded) very dark. Ear-coverts dark. Underparts paler and greyer.



x c. 1

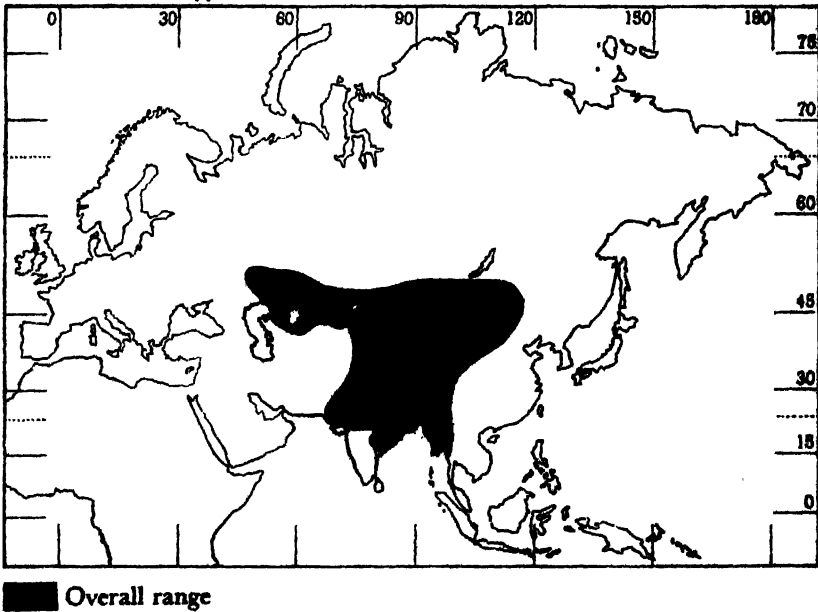
STATUS, DISTRIBUTION and HABITAT. Resident and partly migratory — W. Pakistan and N. India up to c. 1800 m. alt. in the Himalayas, from Kashmir, Himachal Pradesh, Punjab, Nepal (Valley and lowlands) through the Gangetic Plain east to Assam and E. Pakistan, south to a line roughly from Surat (21°10'N.) to Gopalpur (19°20'N.) south of Chilka lake in

Orissa. Affects the neighbourhood of large rivers, tidal creeks, and inland lakes and jheels.

Extralimital. 'S. Russia through C. Asia to Transbaikalia and south to the Persian Gulf, N. India and N. Burma' (Peters).

MIGRATION. No specific data, but from the large numbers to be seen in summer in the treeless Kailas-Manasarovar region of W. Tibet, dotted about the meandering streams and bogs (Sálím Ali, JBNHS 46: 304) it is reasonable to surmise that these eagles migrate for reproduction purposes to our area. Suitable conditions for this include not only tree sites but also a plentiful fish supply for the young, which is unlikely to be obtainable in Tibet in winter due to freezing of the streams. According to Biswas it is very common and conspicuous [breeding] about the 'Salt Lakes' near Calcutta between October and April, but disappears during the hottest months, about May to September. This is good corroborative evidence.

Haliaeetus leucoryphus



GENERAL HABITS. Normally seen perched on a mound, fishing stake or tree-top by a jheel, or on a sandbank in a river, or sailing aloft in wide circles uttering its loud creaking call from time to time. Particularly noisy during the breeding season when pairs indulge in aerobatics of the typical raptor pattern. Hunts fish by hurling itself on one near the surface and carrying it off in its talons. Does not plunge in like Osprey. Sometimes fish of large size are struck—once one weighing 6 kg. Being unable to lift such heavy weights clear, the bird is obliged to drag the quarry along the water till it can be beached on a shelving bank, and there devoured. Also obtains its food by pirating on ospreys, Brahminy kites, and marsh harriers, attacking and chasing them with determination and depriving them of their lawful

prize. At large breeding heronries, e.g. Keoladeo Ghana, Bharatpur, obtains good and easy living by marauding nests of white ibises, openbill storks, etc. Young darters (*Anhinga*) when half to three-quarters grown are particularly relished, the eagle sailing leisurely over the nest trees and picking its choice of the fat squabs. Every time it sails or skims over the nest colony the adults set up a chorus of deep long-drawn grunting 'alerts' which sounds like a continuous roar heralding the marauder's progress. At the same time all the birds train their bill-points at the eagle as if to ward off the threatened onslaught. Also works havoc among flightless young terns in river-bed colonies. In winter subsists largely on immigrant coots, making constant raids on the swimming herds and scattering them. Its strategy is to isolate one individual and stoop on it repeatedly as it surfaces for breath until it is exhausted and can be seized and borne away hanging limply from the talons. Occasionally both birds of a pair will take turns in this process of attrition. Has been observed to sit on a struggling victim in shallow water for some minutes in a seemingly deliberate attempt to drown it.

FOOD. Chiefly fish, but also water-birds such as coots and purple moorhens. Wildfowl as large as Barheaded Goose falling to a sportsman's gun snatched from almost under his nose. Sometimes even large uninjured birds like Demoiselle crane are killed. Snakes, frogs, mud turtles and carrion also recorded, and in one case an entire dead cat was carried off. In a nest near Hardwar (U.P.), B. B. Osmaston found three young eaglets together with the arm of a man, doubtless off a corpse floating in the Ganges. Takes heavy toll of young geese (*Anser indicus*) in Ladakh.

VOICE and CALLS. Loud, far-carrying raucous shrieks very like the creaking of the unoiled wooden block tackle of a village well. Reminiscent of 'a hoarse Pekinese barking and very similar to the call of the Whitetailed Sea Eagle, *H. albicilla*' (P. I. R. Maclaren). At very close range, a preliminary low croaking audible; also another note exactly like a hen clucking to her chickens only repeated rhythmically (H. A. F. Magrath).

BREEDING. Commonly to c. 1800 m. alt. in the Himalayas, and more or less wherever found in the plains. Season, October to February; mainly November, December, January. Nest, a huge stick platform as of No. 173 usually lined with green leaves. Built c. 15 to 35 metres up in a large simul (*Salmalia*), peepul (*Ficus*), chenar (*Platanus*) or other tree, or *Borassus* or coconut palm standing in or near a swamp, river, or lake often on village outskirts. Eggs, 2 to 4, usually 3, white, unmarked. Average size of 60 eggs 69.7×55.1 mm. (Baker). Both sexes share in building the nest and incubation. Period unrecorded. Both parents forage for and feed the young.

MUSEUM DIAGNOSIS. Adult, with a well-marked ruff of lanceolate feathers. Tail brown with a white cross-band c. 10 cm. broad, c. 8 cm. up from the end. Immature: Feathers of breast lanceolate; with a distinct ruff. Tail variegated and mottled brown and white.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	555-578	50-55	100-103	271-275 mm.
♀♀	558-598	59-62	98-106	274-291 mm.
				(Baker)

COLOURS OF BARE PARTS. Iris greyish yellow to yellow. Bill dark slaty black or plumbeous; cere and gape paler. Legs and feet dull white, yellowish white, or dull yellow; claws black.

Genus *ICHTHYOPHAGA* Lesson

Ichthyophaga Lesson, 1843, *Echo du Monde Savant* (2), 7: col. 14. Type, by monotypy, *Ichthyophaga javana* Lesson = *Falco ichthyaetus* Horsfield

In some respects very close to *Pandion*, but unlike it the feathers have aftershafts as in true eagles (*Aquila*). Tarsus very powerful, feathered on upper third or half; scutellated in front and behind, reticulated at sides. Toes equally powerful, scutellated above, with enormous strongly curved claws not grooved underneath. Soles of feet densely covered with little spicules for grasping slippery prey (fish). Outer toe reversible as in *Pandion* but to a lesser extent. Wing rounded; 4th and 5th primaries (as.) longest and subequal; 1st primary shorter than secondaries. Tail moderately long; slightly rounded.

The genus contains two species confined to the Oriental Region.

Key to the Species

	Page
All tail-feathers tipped with brown, white on basal two-thirds.....	
..... <i>I. ichthyaetus</i>	292
Central tail-feathers brown throughout..... <i>I. nana</i>	294

ICHTHYOPHAGA ICHTHYAETUS (Horsfield)

Key to the Subspecies

Larger; wing 450 mm. or over.....	<i>I. i. ichthyaetus</i>
Smaller; wing 440 mm. or under.....	<i>I. i. plumbeiceps</i>

175. **Greyheaded Fishing Eagle.** *Ichthyophaga ichthyaetus ichthyaetus* (Horsfield)

Falco Ichthyaetus Horsfield, 1821, *Trans. Linn. Soc. London*, 13(1): 136 (Java)
Baker, *FBI No. 1780*, Vol. 5: 114

Plate 15, fig. 5, facing p. 272

LOCAL NAMES. *Madhuya* (Hindi); *Machhmoral* (Bengal); *Na daoling gadaba* (Cachari).

SIZE. Kite +; length c. 74 cm. (29 in.).

FIELD CHARACTERS. *Adult.* *Above*, head and neck grey; crown, nape, and upper back light brown. Rest of upperparts dark brown; wing quills blackish. *Below*, breast paler brown than back. Abdomen, flanks and tail white, the last with a blackish terminal band 5 to 8 cm. broad. Sexes alike

In overhead aspect the comparatively short white black-bordered tail, brown breast, and white abdomen and vent diagnostic.

Young (immature). *Above*, Dark brown, the feathers edged with pale greyish. Wing quills barred. Head and neck brown streaked with whitish. *Below*, chin, throat, and sides of head greyish. Breast and flanks pale brown broadly streaked with white. White portions of abdomen, flanks and tail heavily mottled with brown.

STATUS, DISTRIBUTION and HABITAT. Resident. Widely though sparsely distributed except in W. Pakistan and north-west of Delhi (Punjab etc.), and in arid semi-desert biotope. East to Assam and E. Pakistan (commonest in W. Bengal, Bihar, E. Pakistan and Assam), south from the Himalayan terai and foothills to Kerala. Also Nepal (though no recent record). Affects the neighbourhood of perennial, comparatively sluggish streams, rivers, and lakes and tidal lagoons (Bengal), in well-watered, well-wooded plains country.

Extralimital. Burma, Malay Peninsula, Philippines, Greater Sunda Islands and eastward to Celebes (Sulawesi).

GENERAL HABITS. A predominantly fish-eating eagle, met singly or in widely spaced pairs sitting bolt upright on boughs overlooking clear shingly perennial streams and rock pools in forest—in more or less the same facies as favoured by the Storkbilled Kingfisher. Rather sluggish, and with a heavy-looking though rapid flight, the wing-beats sharp and full. Soars and circles aloft much less frequently, and for shorter periods, than most other eagles. Fish captured from near the surface by swooping from the air while quartering a likely reach of river, but chiefly from a lookout perch. Does not plunge like osprey. Very noisy during breeding season. Courtship display not recorded.

FOOD. Almost exclusively fish, some of very large size which, being too heavy to lift clear of the water, are dragged along to the bank. When feeding nest-young may take birds and small mammals; thus remains of junglefowl and squirrels recorded near nest.

VOICE and CALLS. A weird, clanging cry, loud and far-carrying, of the timbre of a Grey Hornbill's (*Tockus birostris*) 'laugh' or peacock's *may-awe*. Uttered singly as a shout or a succession of screams, on the wing or from a concealed perch.

BREEDING. *Season*, mainly November to January. *Nest*, an enormous platform of sticks and twigs sometimes up to 1.50 m. across and 1 m. thick—the result of additions year by year. Frequently maintains two (or three?) alternative nests within a mile or so of each other, used irregularly in successive seasons. Built 10 to 30 metres up in or at the top of large trees such as *Salmalia*, *Terminalia* or *Albizzia* near a forest stream or tank. The pair roosts in the proximity of one of the nests throughout the year. *Eggs*, normally 2, occasionally 3, very rarely 4. White, unmarked, similar to but proportionately longer than those of *Haliaeetus leucorhynchus*. Average size of 20 eggs 68.5 × 51.9 mm. (Baker). Both sexes share in nest-building and repair, as well as in incubation and nest-feeding. Incubation period 28–30 days; young remain in nest c. 10 weeks (*vide* Baker).

MUSEUM DIAGNOSIS. All tail-feathers white on basal two-thirds; blackish brown on terminal one-third. Differs from the Ceylon race (176) in being larger.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	450–515	47–54	92–100	248–280 mm. (Baker)

COLOURS OF BARE PARTS. Iris: adult, bright golden yellow; immature, brown or mottled with brown; nestling, blue-brown. Bill dark horny brown; base bluish

plumbeous; cere brown. Legs and feet china white to dull pale yellowish grey; claws black.

176. Ceylon Greyheaded Fishing Eagle. *Ichthyophaga ichthyaetus plumbeiceps* Baker

Ichthyophaga ichthyaetus plumbeiceps Baker, 1927, Bull. Brit. Orn. Cl., 47: 150
(Trincornalce, Ceylon)

Baker, FBI No. 1781, Vol. 5: 116

LOCAL NAMES. *Wéwa rājaliya*, *Lūl māra* (Sinhala); *Vidai āli* (Tamil). 'Tank Eagle' of local birdwatchers.

SIZE. Kite+; length c. 69 cm. (27 in.).

FIELD CHARACTERS. As in 175.

STATUS, DISTRIBUTION and HABITAT. Race peculiar to Ceylon. Fairly plentiful. Affects the jungle borders of irrigation tanks, coastal lagoons and estuaries, and the larger rivers in the low-country dry zone.

GENERAL HABITS and FOOD. As in 175.

VOICE and CALLS. 'A loud unmusical, rather weird shout with a curious gurgling quality — *awh awhrr*, etc. Uttered early morning and late evening and sometimes far into the night — especially in the breeding season' (G. M. Henry).

BREEDING. *Season*, December to March. *Nest* and site similar to those of the Indian bird. *Eggs*, only 1 or 2 recorded; dirty white measuring c. 64 × 51 mm. (Baker).

MUSEUM DIAGNOSIS. Differs from the nominate race by smaller size, and in most adult birds being perhaps less cinereous brown above.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	420-435 (once 445)	c. 46	c. 85-90	232-242 mm. (Baker)

COLOURS OF BARE PARTS. As in Indian birds.

177. Himalayan Greyheaded Fishing Eagle. *Ichthyophaga nana plumbea* (Jerdon)

Polioaetus plumbeus 'Hodgson' = Jerdon, 1871, Ibis: 336 (North-western Himalayas)
Baker, FBI No. 1783, Vol. 5: 117

Plate 11, fig. 3, facing p. 208

LOCAL NAME. *Na daoling kashiba* (Cachari).

SIZE. Kite±; length c. 64 cm. (25 in.).

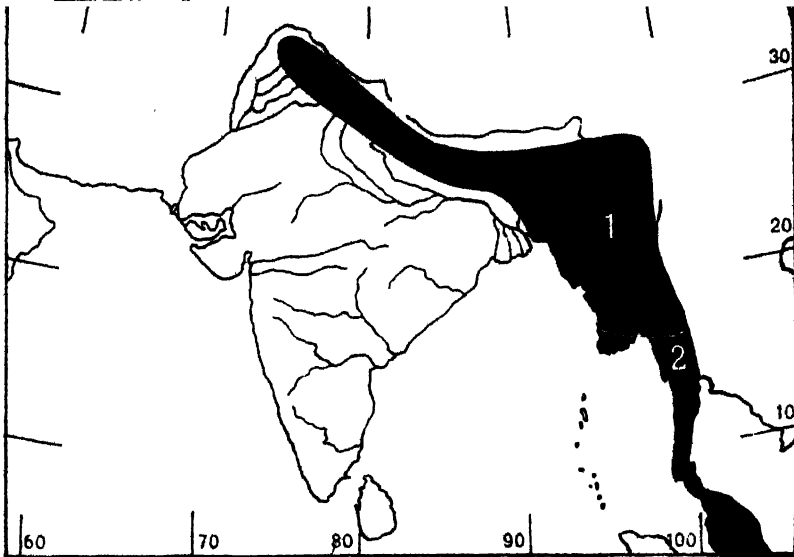
FIELD CHARACTERS. Very similar to Greyheaded Fishing Eagle (175) except that the head is purer grey, less brown on crown, with the feathers black-shafted above and below. Basal two-thirds of tail mottled brown and white looking greyish instead of pure white; terminal third blackish. Central

pair of tail-feathers dark brown throughout, with broad blackish subterminal band and pale tip. Sexes alike.

In overhead aspect the different tail pattern readily distinguishes it from 175.

Y o u n g (immature) differs from adult as in 175.

Ichthyophaga nana



Residential range

1 *I. n. plumbea*; 2 *I. n. nana*

STATUS, DISTRIBUTION and HABITAT. Resident, Kashmir and Himachal Pradesh, east through Nepal to eastern Assam and E. Pakistan (?); from the foothills to c. 2400 metres altitude. The optimum zone is apparently between c. 1000 and 1500 m. in Kashmir; under 1000 m. in the eastern Himalayas. In winter wanders into the adjoining terai and plains of the Punjab, U.P. and Bihar — once as far south as Melghat (c. 21°40'N., 77° 10'E.), Madhya Pradesh (D'Abreu). Affects clear rapid forest streams in the foothills and terai, and jheels and irrigation tanks — rarely even comparatively open reaches of rivers.

Extralimital. Upper Burma. Represented in L. Burma and Malaysia to Sumatra by the smaller nominate race.

GENERAL HABITS. Not appreciably different from 175. When disturbed sitting rather hunched up on a low snag or rock amid stream in forest, rises perpendicularly with a series of slow owl-like flaps to clear the tall trees fringing the banks.

FOOD. Like 175, almost exclusively fish. Sometimes destructive to trout in Himalayan streams.

VOICE and CALLS. Very noisy when nesting. Incubating bird greets arrival of mate at nest by 'a succession of querulous shouts and cackles,

not unlike a very small child crying. In the distance this sounds distinctly plaintive and childlike, but at close quarters querulous and unpleasant' (C. H. Donald).

BREEDING. *Season*, chiefly March, April, May. *Nest*, as in 175 a huge pile of sticks and twigs attaining enormous proportions by addition of more material year by year since the same nest is used for a great many years in succession; usually well lined with green leaves. Built in tall trees in forest on or near a river bank. *Eggs*, 2 or 3, small replicas of those of the larger Greyheaded species. Average size of 28 eggs 65.2×50.3 mm. (Baker). Share of the sexes in the domestic chores unrecorded.

MUSEUM DIAGNOSIS. Central tail-feathers brown throughout, darker and pale-tipped on terminal third, *contra* white with broad blackish terminal band in *I. ichthyaetus*.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	435-495	40-46	78-91	223-248 mm. (Baker)

3 ♂♂ recently collected in Nepal measure:

	(from skull)		
426-467	43-48	—	215-238 mm. (Biswas)

COLOURS OF BARE PARTS. 'Iris golden yellow. Bill black, plumbeous on base and lower mandible; cere slaty. Legs and feet dull white with bluish tinge at "knees" and on the digits; claws black; pads dirty white' (Biswas).

Genus *TORGOS* Kaup

Torgos Kaup, 1828, Isis 21, col. 1144. Type, by monotypy, *Vultur auricularis* Daudin = *Vultur tracheliotus* Forster

Sarcogyps Lesson, 1842, Echo du Monde Savant (2), 6, col. 1038. Type, by monotypy *Vultur ponticerianus* Latham = *Vultur calvus* Scopoli

Distinguished by the possession of a large wattle of skin behind and below each ear. Skin of head and neck bare without any down. Ruff even smaller than in *Aegyptius*, q.v.

178. Black or King Vulture. *Torgos calvus* (Scopoli)

Vultur calvus Scopoli, 1786, Del. Faun. et Flor. Insubr., 2: 85
(Pondicherry, ex Sonnerat)

Baker, FBI No. 1706, Vol. 5: 9

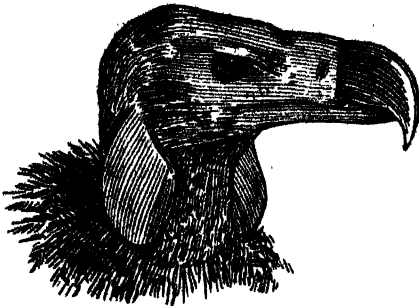
Plate 16, fig. 2, facing p. 288

OTHER NAME. Pondicherry Vulture.

LOCAL NAMES. *Rāj gidh*, *Mulla gidh*, *Bhāonra* (Hindi); *Rāj shakoon*, *Kālo shakoon* (Bengal); *Kannara gidh* (Bihar); *Lāl gidh* (Cachar); *Rāj hogan* (Assam); *Loong nong loong* (Lepcha); *Nālla bōrdwā* (Telugu).

SIZE. Whitebacked Vulture ±; length c. 84 cm. (c. 33 in.).

FIELD CHARACTERS. A huge black vulture readily identified by its deep yellowish red naked head and neck, thighs and legs. White patches at



x c. 1

base of neck and on upper thighs are additional pointers. When sailing aloft the red head, white breast and thigh-patches, and a thin whitish band along underside of outstretched wings conspicuous, even at long range. Wings rather pointed with moderately splayed 'fingertips'; held above plane of back in a wide V. Sexes alike.

Young (immature). *Above*, brown, scalloped paler. Crown covered with white down; neck partly feathered. *Below*, crop white;

breast, anterior flanks and abdomen pale brown; posterior flanks and abdomen, and under tail-coverts, white.

STATUS, DISTRIBUTION and HABITAT. Resident. Throughout the Indian Union, both Pakistans, Nepal, up to c. 2000 metres altitude in the Himalayas locally. Not Ceylon. Sparse and nowhere numerically abundant. Affects the open countryside — chiefly deciduous and semi-desert biotope — in the neighbourhood of habitations.

Extralimital. Burma, Thailand, Malay Peninsula, S. Viet Nam.

GENERAL HABITS. Much less gregarious than the other large vultures. Even at animal carcasses seldom more than a solitary or a couple present among the seething rabble of Whitebacks and others. Very rarely, however, pure gatherings of up to 20 or 30 birds may be met. Called 'King' Vulture because of a spurious reputation for boldness and overbearing pugnacity inspiring awe amongst its fellow feasters and thus monopolizing a carcass until it has had its pick of the choicest titbits. In actual fact it may usually be marked out as the timidest member of the vulture gatherings at wayside carcasses. It keeps itself deferentially aloof of the scrimmage, only venturing forward surreptitiously now and again in obvious nervousness to tug at a gobbet, and withdrawing hurriedly when overwhelmed by the press. It is a powerful bird and in spite of its size and weight can lift itself off the ground by a few wing-strokes even when fully gorged.

FOOD. Almost exclusively carrion. In common with other vultures highly beneficial as a scavenger, disposing quickly of animal carcasses from the precincts of villages where they would otherwise putrefy and breed disease. Once recorded swooping on a wounded Greenshank (*Tringa nebularia*)!

VOICE and CALLS. 'A hoarse croak, with a sort of scream affixed to it when quarrelling at a carcass' (T. R. Bell). A raucous 'roaring' during copulation.

BREEDING. *Season*, overall December to April, earlier in the plains, later in the lower Himalayas; most generally February and March. *Nest*, a large platform of sticks and twigs, untidily lined with straw and leaves; less massive and thick than of many eagles. Built c. 9 to 12 metres up on the top of a large tree like peepul (*Ficus*) or mango (*Mangifera*) often near a village.

In semi-desert areas even on bushes or small trees, e.g. *Prosopis*, barely 2 or 3 metres up. Same nest and/or site used year after year. *Egg*, a singleton, roundish oval, white, becoming stained and discoloured during incubation. Average size of 60 eggs 83.9×66.0 mm. (Baker). Both sexes share in building the nest, incubation, and feeding the young. Incubation period about 45 days.

Copulation on the wing has occasionally been reported, but in the case of such ponderous birds this seems an incredible feat of jugglery! Perhaps only slow-motion cinematography can reveal the actual details of the 'plunges and wing-flappings' of the birds (pair?) towards the ground with claws interlocked — not infrequently seen during aerial courtship in the breeding season — and of two birds sailing with outstretched motionless wings one over the other, so close as to appear almost in contact.

MUSEUM DIAGNOSIS

Chick (in down). 'Crown from level of eyes, and nape, clothed with short close grey-white down; rest of upperparts with longer grey-white. Centre of chin and throat sparsely tufted same. Crop with thicker buff-tinged down; sides of breast and flanks longer pale buff down. Bare skin of face, and upperparts of head and cere pale bluish lead colour in contrast to skin of throat, chin, and neck which is pinkish lead. A bare ring c. 32 mm. wide round neck from nape, bare with longitudinal flaps of loose skin, a prominent one on each side, being probably the origin of the adult wattles' (Whistler).

MEASUREMENTS

	Wing	Bill (from forehead)	Tarsus	Tail
♂ ♀	600-625	74-80	108-116	226-257 mm. (Baker)

Two recent specimens from Nepal have Wing ♂ 566, ♀ 592; tail ♂ 248, ♀ 250 mm. (Biswas).

COLOURS OF BARE PARTS. Iris yellow, red-brown or crimson. Bill dark brown, yellowish at base of lower mandible. Cere and bare skin of head and neck deep yellowish red; wattles redder. Bare skin on either side of crop and inside thighs duller yellowish red. Legs dull livid fleshy to dull red.

Genus *AEGYPIUS* Savigny

Aegyptus Savigny, 1809, Descr. Egypte, Ois., 1: 68, 73. Type, by monotypy, *Vultur niger* Daudin = *Vultur monachus* Linnaeus

Bill comparatively short, very strong, deep and arching from the cere. Nostrils almost square (with rounded corners); oblique. Head broad and covered with down, short on crown longer on nape. Neck naked with a moderate ruff at base reaching up to its back. Claws grooved below.

Genus monotypic. Found in Southern Europe, temperate Asia, N. Africa.

179. **Cinereous Vulture.** *Aegyptus monachus* (Linnaeus)

Vultur Monachus Linnaeus, 1766, Syst. Nat., ed. 12, 1: 122

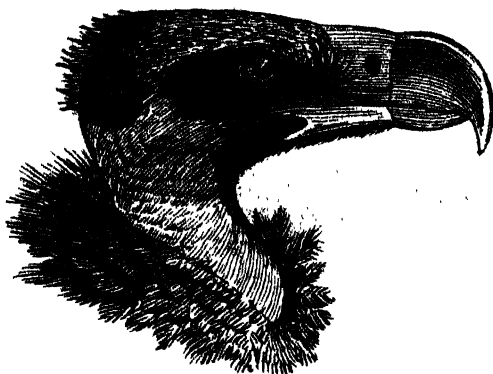
(Arabia, ex Edwards, pl. 290)

Baker, FBI No. 1705, Vol. 5: 7

LOCAL NAMES. *Kāla gidh* (Hindi); *Gat panom* (Lepcha).

SIZE. Vulture +; length c. 100-110 cm. (40-42 in.).

FIELD CHARACTERS. A huge, uniformly black or blackish brown vulture with naked leaden pinkish neck surrounded by a distinct blackish (not white) ruff. Partially naked head conspicuously broader than in other vultures. Crown, occiput, lores and cheeks covered with black fur-like feathers and down. No fleshy wattles on sides of neck. Sexes alike.



× c. ½

In overhead aspect dark plumage above and below, absence of white crop- and thigh-patches, broader wings without whitish stripe, and slightly wedge-shaped (*v.* rounded) tail distinguish it from King Vulture (178).

Y o u n g (immature). Paler and browner.

STATUS, DISTRIBUTION and HABITAT. Resident (breeding) in the high mountains of W. Pakistan (Baluchistan) and India in Gilgit, Punjab (Lahul), Assam (N. Cachar) and possibly elsewhere along the stretch of the Himalayan Dry Temperate zone between *c.* 1800 and 3600 m. alt. Rare and sparse winter visitor to Sind, NW. and northern India (including Nepal), Kutch, N. Gujarat and central India, south to about the latitude of Dhulia in Khandesh (*c.* 21°N.). Affects open savannah and semi-desert country; avoids forest.

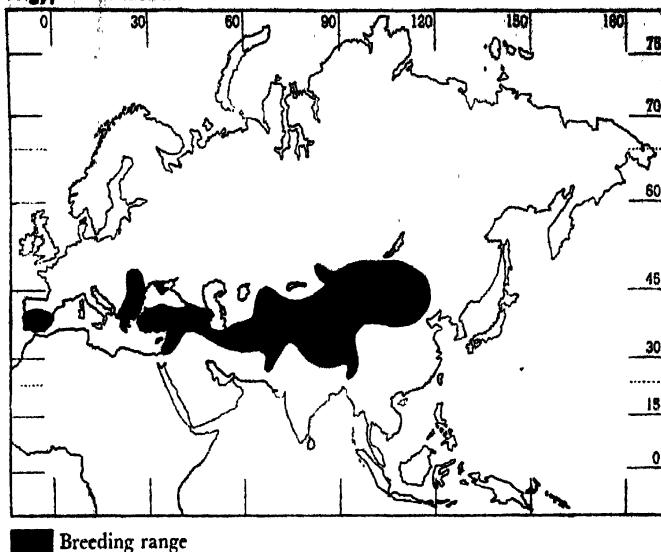
Extralimital. 'Breeds locally in S. Europe from Portugal to the lower Danube, the Caucasus and southern Urals to NE. Tibet and E. China, south to N. Morocco, Asia Minor, and the Himalayas' (Peters).

GENERAL HABITS. Very little recorded in India. A rare vulture, seen singly in winter perched on mounds etc. where its enormous size and all-black coloration immediately attract attention. Joins the vulture mobs feasting on wayside animal carcasses where it seems to command a distinct deference from the other species, boldly striding forward through the jostling rabble and helping itself to the repast without let or hindrance.

FOOD. Carrion. One feeding on dead Painted Stork (*Ibis leucocephalus*) (E. A. Butler). Elsewhere recorded as hunting tortoises and extracting the meat from under the carapace.

VOICE and CALLS. Unrecorded.

BREEDING. Within our limits only recorded in Baluchistan, between *c.* 2400 and 3000 metres elevation, and in the Barail Range of N. Cachar

Aegyptius monachus

at c. 1800 m. *Season*, apparently March and April though eggs have been taken in Assam in January and May. *Nest*, an enormous mass of sticks and twigs added to year after year; in one case c. 2 metres deep (from base to top) and c. 1.5 m. in diameter. Built right on top of a juniper or suchlike tree 8 to 12 m. high or more, growing on a steep hillside or out of a cliff. *Egg*, a singleton, very handsome, varying in ground colour from pure white to pale buff or creamy buff and richly marked with deep red, red-brown or purplish brown. Sometimes white, quite unmarked. Average size of 18 eggs taken in India and Turkestan 90.6×69.5 mm. (Baker). Share of the sexes in the domestic chores, and incubation period, unrecorded.

MUSEUM DIAGNOSIS. For description of plumage see Baker, loc. cit.

Chick (in down) about one week old, smoky grey. Cere light pink; bill darkish at tip. Iris yellowish. Legs and feet creamy white; claws black (F. L. Hughes).

MEASUREMENTS

	Wing	Bill (from forehead)	Tarsus	Tail
♂ ♀	756-843	c. 80-88	c. 132-146	350-400 mm. (Baker)

An adult measured 8 ft. 11½ inches (273 cm.) from wing-tip to wing-tip (Delme-Radcliffe).

COLOURS OF BARE PARTS. Iris brown. Bill blackish brown, sometimes yellowish at base and on lower mandible; cere pale mauve, plumbeous grey, or almost salmon pink. Naked skin of neck dirty white slightly tinged with red, or livid flesh colour. Legs and feet creamy or pearl white.

Genus *GYPs* Savigny

Gyps Savigny, 1809, Descr. Egypte, Ois., 1: 68, 71. Type, by monotypy, *Gyps vulgaris* Savigny = *Vultur fulvus* Hablizl

Pseudogyps Sharpe, 1873, Ann. and Mag. Nat. Hist., 11(4): 133. Type, by subsequent designation, *Vultur bengalensis* Gmelin. (Sharpe, 1874, Cat. Bds. Brit. Mus., 1: 11)

Distinguished from *Torgos* in having no ear lappets. Head narrower and longer in proportion; bill slenderer and longer. Nostrils very narrow slit-like, vertical or slightly oblique. Ruff at base of neck well developed, consisting of long narrow feathers. Tail-feathers 12 or 14.

Genus represented throughout Africa, S. Europe, SW. and C. Asia.

Key to the Species

		Page
A	Tail-feathers twelve..... <i>G. bengalensis</i>	307
B	Tail-feathers fourteen	1
1	Bill smaller and more slender; depth of base of bill less than length of cere..... <i>G. indicus</i>	304
	Bill larger and less slender; depth of base equal to length of cere....a	
a	Lower plumage with narrow shaft-stripes..... <i>G. fulvus</i>	301
	Lower plumage with broad shaft-stripes..... <i>G. himalayensis</i>	302

180. **Indian Griffon Vulture.** *Gyps fulvus fulvescens* Hume

Gyps Fulvescens Hume, 1869, My Scrap Book, 1: 15, 19. (Punjab, northern Rajasthan and 'North-West Provinces' (= Uttar Pradesh), north and west of Etawah = Gurgaon, Punjab, according to Baker, 1928, p. 11)

Baker, FBI No. 707, Vol. 5: 11

LOCAL NAMES. Unrecorded.

SIZE. Whitebacked Vulture +; length c. 110–122 cm. (40–48 in.).

FIELD CHARACTERS. Adult. An enormous cinnamon-brown vulture with scrawny, almost naked neck. Head covered uniformly with yellowish white hair-like feathers and down. Underparts pinkish brown with narrow pale shaft-stripes. A prominent whitish ruff of lanceolate downy feathers at base of neck. Sexes alike.

In overhead aspect looks a dirty white with the quills forming a broad black apex and trailing edge to the broad 'splayed finger' wings, and black tail. Cannot be differentiated from Himalayan Griffon (181) on the wing; distinguishable from Cinereous Vulture (179) by whitish underparts and square or slightly rounded (v. slightly wedge-shaped) tail.

Y o u n g (immature). Darker fulvous-brown with the ruff browner than in adult.

STATUS, DISTRIBUTION and HABITAT. W. Pakistan (Baluchistan, Sind) and northern India (including Nepal lowlands). Commoner in the semi-desert areas of W. Pakistan and N. Gujarat, straggling east to W. Assam plains, south roughly to latitude 20°N.; occasionally further south in the Deccan. Southernmost authentic record, a specimen from Bombay (Kurla) in BNHS coll. Owing to constant confusion in sight records and paucity of collected

material, accurate range difficult to define; also to determine whether this or the nominate race (found in Iran) breeds in Baluchistan. Affects bare mountains and open savannah and semi-desert country.

GENERAL HABITS. Small numbers usually present among the gatherings at animal carcasses of the commoner Whitebacked and Longbilled species, in the semi-desert parts of north-western India. Easily recognized from them by its great size and warm cinnamon coloration. Habits similar to those of other members of the genus, described under the Whiteback (185), q.v.

FOOD, VOICE and CALLS. As in 185.

BREEDING. Old published records of breeding in Bihar, Oudh and Madhya Pradesh, etc., are generally vitiated by doubtful identification as pointed out above. However, breeding in the mountains of Baluchistan, at c. 2500-3000 m. elevation, and in Kashmir, well authenticated though race merely presumed (probably correctly) as the Indian *fulvescens*. Probably also breeds in the Kirthar Hills between Sind and Baluchistan. *Season*, February to April. *Nest*, a large platform of sticks on ledges of cliffs, built singly or in small colonies.

Eggs, a singleton, white, occasionally flecked with red; rarely blotched and spotted with the same. Average size of 25 eggs 90.7×70.2 mm. (Baker). Both sexes said to assist in building the nest. Incubation period and other details unrecorded.

MUSEUM DIAGNOSIS. Differs from the nominate European race in being more cinnamon-brown than isabelline. For description of plumage etc. see Baker, loc. cit. Easily confusable with sub-adult *G. indicus*; may be differentiated as follows:

<i>indicus</i>		<i>fulvescens</i>	
1. Smaller		1. Larger	
2. Down on head more patchy; starred rather than a uniform covering		2. Head uniformly covered with down	
3. General colour dirty earth-brown		3. General colour warm cinnamon-brown	

MEASUREMENTS

	Wing	Bill (from forehead)	Tarsus	Tail
♂ ♀	675-740	c. 71-74	c. 100-120	302-330 mm. (Baker)

Wing ♂ ♀ 685-747 mm. (both extremes ♂) (Kirke-Swann).

COLOURS OF BARE PARTS. Iris yellow-brown to brown. Bill yellowish or greenish horny to dusky brown sometimes paler along edge of culmen; cere black. Legs and feet dirty yellow to greenish grey (Baker).

181. Himalayan Griffon Vulture. *Gyps himalayensis* Hume

Gyps Himalayensis Hume, 1869, Rough Notes, 12, 15
(Himalayas from Kabul to Bhutan)

Baker, FBI No. 1709, Vol. 5: 13

Plate 6, fig. 7, facing p. 112

LOCAL NAMES. *Bādd gidh* (Chamba); *Grād* (Kashmir).

SIZE. Whitebacked Vulture +; c. 122 cm. (48 in.).

FIELD CHARACTERS. Virtually the largest bird in the Himalayas. A typical vulture, very like 180, but adult sandy white or pale khaki above instead of cinnamon-brown. *Below*, pale brownish buff with conspicuously broader whitish shaft-streaks than in *fulvescens*. Ruff longer, pale brown streaked with white. Sexes alike. Many intermediate colour phases depending on age.

In overhead aspect, large size, very pale (almost whitish) underside, black tail, black trailing edges of the broad, almost rectangular wings together with their 'splayed finger' tips, and High Himalayan domicile are diagnostic.

Young (immature). Dark brown and chocolate-brown with whitish shaft-stripes, especially broad on ruff and underparts. Wing and tail-feathers nearly black. Overhead aspect very like *Aegypius monachus* except for the white round the crop-patch, the less uniformly dark colouring produced by striped underparts, and the somewhat less broad wings. Confusable also with immature Whitebacked and Longbilled vultures, but much larger and seldom likely to be met together in same habitats.

STATUS, DISTRIBUTION and HABITAT. A purely mountain bird. Resident in the Himalayas from W. Pakistan (NWFP) to Bhutan and W. Assam, normally between c. 600 and 2500 m. altitude, foraging up to 4500 m. and even higher.

Extralimital. Mountains of Afghanistan and Turkestan, Tibet, the Pamirs, and the Himalayas east to W. China.

GENERAL HABITS. Similar to those of Whitebacked Vulture (185) and others of the genus. Normally seen singly or in twos and threes sailing majestically on outspread motionless wings over mountaintop and valley, or sweeping round the rugged contours with astonishing speed and grace, scouting for food. Or it rises on the thermals to immense heights, circling for hours together in the heavens, obviously for fun. Commonly keeps in the neighbourhood of high mountain passes and along well-used trade routes where the stricken pack animals of the caravans provide it with regular sustenance. The birds also follow the flocks and herds of the graziers up to the alpine pastures in spring for any of the animals that may die. The way in which a rabble of 10 to 20 of the great birds will materialize at a carcass on a remote mountain pass from out of the clear blue sky, and the speed and thoroughness with which they will demolish it, is a source of never-failing wonderment. In a few short minutes all that is left of the animal is odd bits of skin, and bones stripped of everything that can be eaten.

BREEDING. *Season*, chiefly January to March or April. *Nest*, a large rough and untidy pad of sticks and rubbish placed on the ledge of a cliff, often inaccessible. Singly, or in small colonies of 5 or 6 nests spaced out on the same cliff-face. Favourite sites, advertised in the distance by the whitewash of the occupants' droppings, are resorted to year after year, the old nests being reconditioned by adding to the ragged remnants of the previous season. *Egg*, a singleton, white, usually unmarked; sometimes handsomely blotched with pale reddish to deep reddish brown. Inside membrane of all *Gyps* eggs dark bright green. Average size of 50 eggs 94.8 × 70.1 mm. (Baker). Share of the sexes in the nesting chores, and period of incubation, unrecorded.

MUSEUM DIAGNOSIS. Bill large and stout; depth at base equal to length of cere. Lower plumage with broad shaft-stripes. For details of plumage etc. see Baker, loc. cit.

MEASUREMENTS

	Wing	Bill (from forehead)	Tarsus	Tail
♂ ♀	755-805	71-77 (once 81)	c. 110-126	365-402 mm. (Baker)

Middle toe and claw 121-135 mm.

Wing ♂ ♀ 790-810 mm. (Kirke-Swann).

COLOURS OF BARE PARTS. Iris dull yellow or creamy yellow to pale brown. Bill horny green, dull yellowish horny or yellowish plumbeous; cere pale brown or greenish brown. Legs and feet dingy greenish grey or white (Baker).

GYPS INDICUS (Scopoli)**Key to the Subspecies**

		Page
A	Crown of head almost or quite bare.....	<i>G. i. tenuirostris</i> 306
B	Crown of head well covered with hair-like feathers.....	1
1	Smaller; wing under 680 mm.....	<i>G. i. indicus</i> 304
	Larger; wing over 690 mm.....	<i>G. i. jonesi</i> 305

182. Indian Longbilled Vulture. *Gyps indicus indicus* (Scopoli)

Vultur indicus Scopoli, 1786, Del. Faun. et Flor. Insubr., 2: 85 (India, ex Sonnerat)
Baker, FBI No. 1710, Vol. 5: 16

LOCAL NAMES. *Gidh* (Hindi); *Gidhād, Mahā dho* (Marathi).

SIZE. Whitebacked Vulture +; length c. 92 cm. (38 in.).

FIELD CHARACTERS. Adult. *Above*, light to dark brown, the feathers edged paler (scalloped). Head, nape, and neck patchily covered with whitish brown hair-like feathers or down. *Below*, a distinct ruff of soft white feathers at base of neck. Underparts pale brown, almost sandy, with broad pale shaft-stripes. Sexes alike.

Easily confused with Indian Griffon Vulture (180). Differs from it in much smaller size; head not uniformly covered but 'starred' with down; general coloration dirty earth-brown v. warm cinnamon-brown.

In overhead aspect pale underparts and underwing with broad black trailing edge as in Griffon, v. a prominent white band stretching along underwing, distinguish it from adult Whitebacked Vulture (185) even at great height. Immature birds of the two species impossible to tell with certainty.

Young (immature). Chocolate-brown. Head and neck more thickly down-clad. Resembles immatures of both Whitebacked Vulture (185) and young Himalayan Griffon (181) but is much smaller than latter.

STATUS, DISTRIBUTION and HABITAT. Resident. Rajasthan, Gujarat and peninsular India south of the Gangetic Plain. Not in extreme SW. India or Ceylon. Wide ranging, with no perceptible habitat preferences.

Owing to paucity of collected material, ranges of this and the next two races can only be approximately assigned.

GENERAL HABITS. Gatherings, sometimes of 20 to 30 birds or more, commonly seen at animal carcasses on the countryside or on outskirts of towns and villages, in more or less equal numbers with the Whitebacked species (185) q.v., from which its habits do not appreciably differ.

FOOD. Carrion exclusively; sometimes at tiger or panther kills in forest.

VOICE and CALLS. Not specifically recorded.

BREEDING. *Season*, overall November to March; principally December/January. *Nest*, a sketchy platform of sticks and twigs lined with straw invariably built on ledges of precipitous cliffs and hill forts. Usually in small colonies, the same cliff-faces and sites being occupied traditionally; easily identified in the distance by the excrementary whitewash of past and continuing vulture generations. By the time the young is fledged practically nothing is left of the nest, the materials being pushed off the ledge by the movements of the youngster or blown away by the wind. *Egg*, a singleton, generally white; sometimes spotted, blotched or freckled with reddish brown in varying degree. Average size of 20 eggs 86.6×67.3 mm. (Baker). Share of the sexes in the domestic chores, and period of incubation, unrecorded.

MUSEUM DIAGNOSIS. Bill smaller and less stout than in Griffon (181); depth at base less than length of cere.

MEASUREMENTS

	Wing	Bill (from forehead)	Tarsus	Tail
♂ ♀	560-650 (mostly 600-625)	c. 66-69	c. 90-94	238-274 mm. (Baker)

Wing ♂ ♀ 575-679 mm. (Kirke-Swann).

COLOURS OF BARE PARTS. Iris brown. Bill greenish or yellowish horny, darker on culmen; cere dull dirty greenish. Bare skin of head and face plumbeous ashy. Legs and feet greenish or plumbeous ashy (Baker).

183. West Pakistan Longbilled Vulture. *Gyps indicus jonesi* Whistler

Gyps indicus jonesi Whistler, 1927, Bull. Brit. Orn. Cl., 47: 74

(Margala Range, Rawalpindi dist.)

Baker, FBI No. 1712, Vol. 5: 18

LOCAL NAMES. Unrecorded.

SIZE. Whitebacked Vulture +; length c. 100 cm. (c. 42 in.).

FIELD CHARACTERS. *Adult*. Like the nominate race (182) but larger and darker dull earthy brown with a thicker covering of buffy white hairs on head and white down on neck. Crop-patch more sooty brown. Ruff buffy white, the feathers short and down as in 182. *Sexes* alike.

Young (immature). Much darker and browner than adult, sometimes boldly streaked above and below with buffy white. Ruff of long lanceolate brownish feathers, boldly streaked paler. Breast-patch generally paler brown.

Overhead aspect of adult and young as in 182.

STATUS, DISTRIBUTION and HABITAT. Resident in the lower Himalayas of West Pakistan at c. 450 to 900 m. altitude, chiefly in the area between the Punjab Salt Range and the Indus river. No habitat preference except that like the nominate race it nests exclusively on precipices.

GENERAL HABITS. Same as of the Whitebacked and other large vultures.
FOOD. Carnion exclusively.

VOICE and CALLS. Not specifically recorded.

BREEDING. Apparently only known from the Kala Chita Reserve in Campbellpur dist., W. Pakistan. *Season*, January–February. *Nest*, a scanty pad of sticks and twigs with leaves attached, and dry grass, built on ledges of a 'whitewashed' cliff face in a scattered colony. *Egg*, a singleton, pure white. Average size of 7 eggs 92.6×68.8 mm. (Baker). No other details recorded.

MUSEUM DIAGNOSIS. Larger than the nominate race, with head and neck more thickly down-covered.

MEASUREMENTS

	Wing	Bill (from forehead) (depth at base 35–36 mm.)	Tarsus	Tail
♂ ♀	700–750	c. 71–74	c. 100–109	300–310 mm.

(Baker)

COLOURS OF BARE PARTS. As in the nominate race.

184. Himalayan Longbilled Vulture. *Gyps indicus tenuirostris* G. R. Gray
Gyps tenuirostris 'Hodgson' = G. R. Gray, 1844, Genera of Birds, 1: 6, pl. 3 (Nepal)
Gyps indicus nudiceps Baker, 1927, Bull. Brit. Orn. Cl., 47: 151 (New name for *Gyps*
tenuirostris Hume, Khatmandoo, Nepal)

Baker, FBI No. 1711, Vol. 5: 17

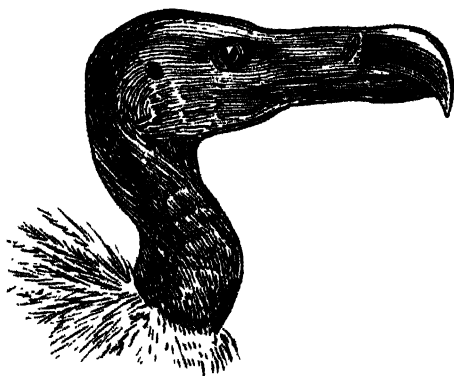
Plate 16, fig. 3, facing p. 288

LOCAL NAMES. *Sakūn* (Bengal); *Hogun* (Assam); *Gut* (Lepcha).

SIZE. Whitebacked Vulture+; length c. 92 cm. (38 in.).

FIELD CHARACTERS. A d u l t and Y o u n g (immature) as in the Indian race (182), but with the head and neck entirely bald and shiny.

STATUS, DISTRIBUTION and HABITAT. Resident. The Gangetic Plain north to and along the lower Himalayas from Kashmir through Nepal, Bengal and Assam. Very common in eastern Assam and East Pakistan.



x c. 1

Extralimital. Burma, Malay Peninsula and Indochinese countries.

GENERAL HABITS. As of the Whitebacked Vulture (185), q.v.

FOOD. Carrion exclusively. While it would seem safe enough to tackle dead or dying animals, some curious accidents to feeding vultures have been reported. One got entrapped within the belly of a defunct horse; another had its head caught inside the mouth of a moribund ox which it had been too impatient to allow to die completely. The bird was found in this predicament flapping its wings helplessly to free itself! (Allen, JBNHS 26: 1045).

VOICE and CALLS. Nothing specifically recorded.

BREEDING. Contrary to the other two races, seems to nest exclusively on trees. *Season*, November to end February. *Nest*, of sticks and twigs sometimes with leaves attached, rather more compact than of the two cliff-nesting races, built 7 to 14 metres up in large leafy trees, such as silk cotton, banyan and peepul; often several nests scattered over a small area, and frequently near a village. *Egg*, a singleton, broad oval, unspotted white, sometimes flecked and blotched with light reddish in varying degree. Average size of 100 eggs 84.7×63.6 mm. (Baker). Both sexes share in all the domestic chores. Incubation period unrecorded.

Chick (about a week old): covered with yellowish brown down (E. H. N. Gill).

MUSEUM DIAGNOSIS. Upper plumage usually darker and browner than in nominate *indicus*. No hairy down on crown and nape; very little or none on neck. Bill slenderer; with larger, more open nostrils.

MEASUREMENTS

	Wing	Bill (from forehead)	Tarsus	Tail
♂ ♀	590-630	66-68	c. 110	237-256 mm. (Baker)

COLOURS OF BARE PARTS. Iris dark brown. 'Bill brownish dusky horny; cere horny black; skin of head and neck dark muddy; tarsi and toes black; claws dusky and horny black' (Hume).

185. Indian Whitebacked Vulture. *Gyps bengalensis* (Gmelin)

Vultur bengalensis Gmelin, 1788, Syst. Nat., 1(1): 245 (Bengal)

Baker, FBI No. 1713, Vol. 5: 19

Plate 16, fig. 6, facing p. 288

LOCAL NAMES. *Gidh* (Hindi); *Gidhād* (Marathi); *Sakun* (Bengal); *Mātti pādūm-gādu* (Telugu); *Walhorya* (Yerukali); *Kāzhūkān* (Malayalam).

SIZE. Peacock minus train \pm ; length c. 90 cm. (35 in.).

FIELD CHARACTERS. **A d u l t.** Heavy brownish black with naked scrawny neck and head sunk into the shoulders while bird at rest. A white or whitish ruff of soft feathers round base of neck, broken in front by a black crop-patch. Sexes alike.

When perched, as well as in flight below eye level, or when banking high up in the air, white lower back diagnostic. In overhead aspect a broad whitish band along underside of wings distinguishes this species.

Young (immature). More brownish than black, without white back or underwing bands. Head and neck more or less covered with dirty white fluffy down. Impossible to distinguish with certainty in the field from Longbilled Vulture, with which it is commonly associated over most of its range.

STATUS, DISTRIBUTION and HABITAT. Resident; our commonest vulture. Found more or less throughout the area from W. Pakistan (Baluchistan) east through Assam and Manipur; south from Kashmir and along the Himalayas between c. 1500 and 2500 m. elevation (including Nepal), through the Peninsula to Kanyakumari. Not Ceylon. Where absent or rare in pure desert facies a few years ago, e.g. Sind, Punjab, and Rajasthan, now well established and expanding with advent of river barrages, canal cultivation, populous villages with livestock, and trees for nesting.

Extralimital. East to Yunnan, south to Siam, and Cochinchina [S. Viet Nam], Malay Peninsula to Penang (Peters).

GENERAL HABITS. Usually seen in small groups, commonly in association with the Longbilled and other vultures, perched hunched-up on tree-tops and palms on the countryside, on roofs or walls in the vicinity of slaughterhouses, municipal refuse dumps, and outskirts of villages and habitations. Favourite roosts and the ground underneath become besmirched and reeking with the birds' acrid excreta, presenting a sepulchral whitewashed appearance, which kills off the trees if too long patronized. And in this way vultures sometimes become a serious local nuisance in coconut groves, mango orchards, forest plantations, etc.

Though a repulsive creature at close quarters, a vulture gliding majestically in the sky on outspread motionless wings looks the embodiment of grace and buoyancy. Unless busy feeding, or fully gorged and grounded, they spend most of the day scouting the countryside for food, covering immense distances in the quest. Or they will soar for hours on end and circle aloft in the sky with no other apparent motive than fun. Their eyesight is remarkably keen yet perhaps less phenomenal than popularly believed. That they are so quick to discover a carcase on the countryside, even though hidden under forest, and to gather at it from almost nowhere in such an incredibly short time, is usually due not so much to keenness of sight directly as to the low-flying birds being guided by the movement of crows, village dogs and jackals. These birds in turn are being watched by their fellows in the air above, and so on, till from tier to tier the message reaches the tiniest speck in the heavens. When following one another down to a carcase some birds make a wide spiral descent while others hurtle down through space more or less perpendicularly, wings half pulled in, legs dropped and dangling. Even while still quite high up in the air this dropping of the 'under-carriage' clearly proclaims a bird's intentions. No less astonishing is the speed and thoroughness with which a party of vultures will demolish the largest carcase. A mixed rabble of 60 to 70 birds (mostly of this species, and including a few kites and crows) was timed to strip the skinned carcases of two sloth bears weighing not less than 125 kg. so thoroughly in the space of about 40 minutes that late comers at this stage had to stand around disappointed (Sálim Ali). In another case a mixed pack of this with a few Fulvous and King Vultures was timed to finish off a whole bullock in about

20 minutes (T. R. Bell). This activity is attended by incessant jostling and squabbling amongst the feasters to a great deal of raucous braying, screeching and hissing as one bird jumps on another's back to dislodge it from a coign of vantage, or deprive it of a gobbet of flesh. The combatants often spread out their wings and prance around, ludicrously tugging at the morsel with their beaks at either end. In order to take off from the ground, vultures are obliged to run and hop along for some distance against the wind aided by powerful wing-flaps. When fully gorged they are sometimes totally unable to get airborne, and often have to spend the night on the ground. Occasionally they feed throughout the night, whether moonlit or dark. It has been suggested, possibly with some truth, that vultures properly gorged can go without a meal for several days. Such a facility could be of distinct survival value to birds which must frequently have to face feast-and-famine conditions.

In spite of foul feeding habits which often entail the head, neck and other parts becoming besmeared with gore, the Whiteback like the other large vultures is a comparatively cleanly bird and misses no opportunity for a bath. The birds wade into shallow water and douse themselves with the customary head-dipping, wing-fluttering and plumage-shuffling, drying themselves in the sun afterwards with open wings, like a cormorant. Possibly dependence on thermal currents contributes to their being late risers; individuals may frequently be seen fast asleep on a branch with head tucked under the wing till the sun is well up in the morning.

FOOD. Exclusively carrion.

VOICE and CALLS. Raucous, strident, creaky screeches or 'laughter' *kakakaka* while one bird is supplanting another at a carcase or roost. Long-drawn grating noises, as of a hoe being scraped over a cement floor, uttered by female during copulation.

BREEDING. *Season*, principally October to March. *Nest*, a large untidy platform of sticks and twigs often with green leaves attached, with a shallow central depression lined with green leaves. Leafy twigs collected from living tree by bird (♂ ?) tugging at it with bill, assisted by vigorous wing-flapping. Nest built c. 10 to 18 m. up at or near the top of a large banyan or peepul (*Ficus bengalensis* or *F. religiosa*), mango (*Mangifera indica*), sheesham (*Dalbergia sissoo* or *D. latifolia*), casuarina, or similar tree growing in or near a village, or lining a road or canal bank. Sometimes in scattered colonies of up to 25 or 40 nests in a grove or small patch of forest. Nest added to and enlarged as the young occupant gets older and heftier (C. M. Inglis). *Egg*, normally a singleton, very rarely 2, thick-shelled, glossless white unmarked, or variably and faintly so with reddish brown, grey-brown, or lavender. Average size of 100 eggs 85.8×64.2 mm. (Baker). Both sexes share in all the domestic chores. Incubation period about 45 days. Nest young fed on regurgitated gobbets of flesh. Several foraging birds of a colony often return together with food in spectacular high-flying armadas, sometimes over enormous distances. Copulation takes place close to the nest and often actually on it while the female is incubating; sometimes during moonlit nights. During the act the female flattens herself on the perch with neck stiffly stretched forward, uttering the harsh scraping screams. Male balances himself on her back with heavy flapping and performs with distinct jerks

and pushes. One of a pair shot at nest brought a new mate on the 5th day, unless both the birds were new (Sálim Ali). Breeding has been observed in immature plumage (A. E. Jones).

MUSEUM DIAGNOSIS. For details of plumage see Baker, loc. cit.

Chick (in down). 'Down covers whole body except a track from base of neck broadening to vent. Down of head and neck shorter than the rest. Mouse-grey in colour except darker patches to the uropygium and along ulnar border. Cere and base patch round eye blue-lead' (C. B. Ticehurst).

MEASUREMENTS

	Wing	Bill (from forehead)	Tarsus	Tail
♂ ♀	535-578	71-81	108-124	217-232 mm. (Baker)

Middle toe and claw 121-136 mm.

The figures for bill and tarsus given above are erroneous as pointed out by Biswas (JBNHS 57: 290, 1960). A specimen (♀) from Nepal measured by him gave wing 555, bill (from nostril) 62, tarsus 94, tail 238 mm. A young non-breeding male from Nepal measured wing 590 mm. (Ripley). Wing 557-608 mm. (Kirke-Swann).

COLOURS OF BARE PARTS. Iris yellowish brown or pale brown. Bill dark plumbeous or greenish plumbeous; culmen greyish or yellowish white; cere shining horny black. Naked skin of head and neck dusky plumbeous. Legs and feet greenish plumbeous to almost black (Baker).

Genus NEOPHRON Savigny

Neophron Savigny, 1809, Descr. Egypte, Ois., 1: 68, 75 and 76. Type, by monotypy, *Vultur percnopterus* Linnaeus.

Bill slender, long; cere and culmen straight at first, greatly hooked at tip. Nostrils elongate, horizontal, slit-like. Crown, sides of head, chin, throat and upper foreneck naked. Neck surrounded by a ruff of lanceolate hackle-like feathers extending up to the nape and round all the lower part of the neck; crop naked. Wings long and pointed; 3rd primary (as.) longest. Tail graduated; wedge-shaped. 3rd and 4th toes united by a web over the length of the basal phalange. Claws rather long, straight, and sharp.

The genus extends over the southern Palaearctic Region, Africa, and W. Asia.

NEOPHRON PERCNOPTERUS (Linnaeus)

Key to the Subspecies

- Bill dark horny-blackish at all ages.....*N. p. percnopterus*
 Bill yellow in adults.....*N. p. ginglynianus*

186. Egyptian Vulture. *Neophron percnopterus percnopterus* (Linnaeus)

Vultur Perenopterus [sic] Linnaeus, 1758, Syst. Nat., ed. 10, 1: 87 (Egypt)

Baker FBI No. 1714, Vol. 5: 22

LOCAL NAMES. *Sāfād gidh*, *Kol murghāb* (Hindi); *Hil* (Sind).

SIZE. Pariah Kite ±; length c. 66 cm. (26 in.).

FIELD CHARACTERS. A small, rather kite-like vulture with naked head but without the long scrawny neck.

Adult. Overall dirty white (except for black wing-quills) with naked yellow head, face, and foreneck. In this race bill dark horny at all ages *v.* yellow in adult *ginginianus*. Sexes alike.

In overhead aspect white with wedge-shaped tail and broad black apex and trailing edge to pointed wings.

Young (immature). Blackish or chocolate-brown mottled with whitish blotches on back, breast, and greater wing-coverts. Many other intermediate colour phases during gradual transition to adult white plumage.

In overhead aspect looks like some eagle, but longer, narrower, wings and wedge-shaped tail always diagnostic. Also very like Lämmergeier, but is much smaller.

STATUS, DISTRIBUTION and HABITAT. Resident and partial altitudinal migrant; from plains level to *c.* 2500 metres in West Pakistan (Baluchistan, Sind, NWF. Province, W. Punjab) and NW. India (Kashmir, Punjab, Himachal Pradesh) possibly straggling into U.P., Kutch, W. Rajasthan, etc. Due to paucity of collected material and reliable specific observation, status of the two races impossible to unravel accurately. Probably both occur together and interbreed over large marginal areas in the north-west. Affects the neighbourhood of human habitations.

Extralimital. 'S. Europe north to S. France, Bukowina and S. Russia, east to Turkestan, Afghanistan and NW. India; south to Morocco, Egypt (and thence to S. Africa), Arabia, Persia, Sind, Canary and Cape Verde Islands' (Peters).

GENERAL HABITS. As in the commoner Indian race (187), *q.v.* Occurs in summer up to *c.* 2500 metres in the hills of N. Baluchistan, NWFP and Punjab between March and September; descending to lower levels for the winter. Also in Himachal Pradesh and Kashmir, where recorded in the Lidar Valley in summer as high as *c.* 3600 m. (R. S. P. Bates).

FOOD. Chiefly carrion and offal as in 187.

VOICE and CALLS. Unrecorded.

BREEDING. Up to elevations of *c.* 2600 metres. *Season*, principally February to April. *Nest, eggs*, and other details as in No. 187. Average size of 100 'Indian' eggs 65.2 × 51.2 mm. (Baker).

MUSEUM DIAGNOSIS. Larger than *N. p. ginginianus*. For other differences between the races see Whistler 1922, *Ibis*: 414; for description of plumages etc. of nominate race, Baker, *loc. cit.*; Witherby 1939, 3: 105-6.

MEASUREMENTS

	Wing	Bill (from cere)	Tarsus	Tail
♂♂	470-520	31-34	75-88	220-260 mm.
♀♀	460-510	—	—	—
				(Witherby)

COLOURS OF BARE PARTS. Iris yellow or dark brown. Bill dusky black; cere reddish yellow. Naked parts of head yellow. Legs and feet dusky yellow; claws black (Baker).

187. **Indian Scavenger Vulture**, *Neophron percnopterus ginginianus* (Latham)*Vultur ginginianus* Latham, 1790, Index Orn., 1: 7

(Gingee, Coromandel, ex Sonnerat)

Baker, FBI No. 1715, Vol. 5: 23

Plate 6, fig. 2, facing p. 112

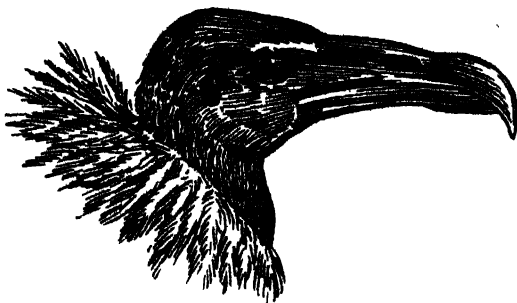
LOCAL NAMES. *Safēd gidh*, *Kāl mūrgh* (Hindi); *Swet sakun* (Bengal); *Gēt gidh* (Bihar); *Tella bōrdwā*, *Pesthiri gādda* (Telugu); *Thotti kāzkhukān* (Malayalam); *Mānjāl thirādi* (Tamil); 'Pharaoh's Chicken'.

SIZE. Pariah Kite; length c. 61 cm. (24 in.).

FIELD CHARACTERS. As for No. 186 only slightly smaller. This race moreover has the bill yellow in adults as against dark horny at all ages in the nominate form.

Young (immature). Differs from young of *percnopterus* only in smaller size.

STATUS, DISTRIBUTION and HABITAT. Resident. All India (except the portions in the NW. occupied by nominate *percnopterus*) from c. 2000 m. up along the Himalayas locally, including Nepal, south to Kanyakumari, east to Bihar and western part of W. Bengal. Not E. Pakistan or Assam. Rare vagrant to Ceylon. Affects the drier peninsular hills (up to c. 2000 m., e.g. in the Nilgiris) and plains in the neighbourhood of human habitations.



x c. 1

GENERAL HABITS. A useful scavenger, invariably keeping to the neighbourhood of human settlements whether town, village, or shifting encampment of gypsies, pilgrims, or herdsmen. Here seen perched on mounds, ruined buildings and the like, or sauntering about on the ground — body held horizontal like a duck's and with a ludicrous, waddling, 'goose-stepping' gait — looking for food. Flight buoyant, easy and graceful, wings held level with body. Spends much time gliding aloft, but seldom at very great heights. Not gregarious; usually seen in twos and threes, but numbers will gather where prospects of food are promising, often associating with kites, crows, and other vultures at animal carcasses and municipal refuse dumps.

FOOD. Carrion, offal and garbage, and to a large extent human ordure. Occasionally takes frogs and large crickets on grassland; in one case *Brachytrypes achatinus* (Mason & Lefroy). Also winged termites emerging from the ground (C. E. Fischer).

VOICE and CALLS. Very silent. Unrecorded.

BREEDING. *Season*, February to May, chiefly March and April. *Nest*, a filthy, shabby platform of twigs, lined with rags, matted hair, scraps of mammals' skin, and other rubbish including sometimes dried dung of carnivores. Placed on a ledge or cornice, or in a niche, on cliffs, dilapidated mosques, tombs and other buildings or crumbling walls and battlements of ancient forts. Sometimes in the fork of a large banyan, peepul, or similar tree *c.* 4 to 6 metres up. The same sites are occupied year after year, the old nests being renovated by additions to the remnants. Old eagles' nests occasionally utilized. Exceptional sites recorded (1) on the ground at the base of a tree in the Ganges *khadar* (W. P. Paynter), and (2) on top of a termite mound *c.* 1.5 metres high islanded in the waterspread of a small irrigation tank (C. H. Biddulph). *Eggs*, 2, incongruously handsome for so unlovely a bird, varying in coloration from white to pale brick-red, blotched with reddish brown or blackish, rather densely at the broad end. Indistinguishable from those of the nominate race, only smaller. Average size of 100 eggs 64.3×49.3 mm. (Baker). Both sexes share all the domestic chores. Incubation period believed to be about 42 days. Incubating bird sits very close, but does not demonstrate against nest robber once disturbed off nest.

MUSEUM DIAGNOSIS. Smaller than nominate race with bill always yellow in adult.

MEASUREMENTS

	Wing	Tarsus	Middle toe and claw	Tail
♂ ♀	443-482	72-85	73-85	228-251 mm.
				(Baker)

Bill (from cere) 31-35 mm.

Paucity of skins in Indian collections does not permit checking the above figures, but it may be pointed out that a recent specimen from Nepal (sex?) measured: wing 434; bill from skull 57; tail 210 mm. (Biswas), showing a considerable divergence from Baker's figures.

COLOURS OF BARE PARTS. Bill in adults yellow. Skin of head yellow with no red tinge. Legs, feet and claws paler, otherwise as in 186.

MISCELLANEOUS. The Hindu hill temple at Thirukalikundram, some 55 km. from Madras, enjoys countrywide fame and added sanctity by virtue of two Neophron vultures that come there every day punctually between 11 a.m. and noon to be fed by the presiding priest. This is alleged to have been going on for 'centuries', and the birds are alleged to commute daily from Banaras (the Himalayas, according to some). The feast consists of balls of rice and wheat flour mixed with sugar and ghee, therefore, in effect, the very opposite extreme of the bird's natural food preference! That the sacred birds travel the 1,300-odd kilometres (or perhaps twice that distance) daily, and the many other myths and legends that have snowballed around this circumstance, perhaps need an extra dose of credulous piety to believe; nevertheless there are a number of curious anomalies in this connexion which challenge a scientific explanation. For instance, when the Neophron is such a common species in the Madras area, and numbers must often fly over this particular temple in their normal scouting for food, why is it that only two birds and no more come down to the proffered meal? Secondly, since Neophrons are not immortal, a replacement must become necessary

from time to time over the 'centuries'. By what process does this take place in such a way that continuity is not disturbed and the two visitors always remain two? A suggestion by the Bombay Natural History Society a few years ago to mark the birds for a rational investigation did not find favour with devout vested interests, so the mystery remains unsolved.

Genus *GYPÆTUS* Storr

Gypætus Storr, 1784, Alpenreise: 69. Type, by monotypy, *Gypætus grandis* Storr = *Vultur aureus* Hablizl

Bill moderately high, compressed, much hooked at end; culmen curved throughout. Nostrils ovals, longitudinal; concealed by long black bristles directed forwards from the cere and lores. Another beard-like tuft of black bristles depending perpendicularly from chin. Tarsi feathered to toes; feet fairly strong with moderate claws, blunt and well curved. Wings long and very pointed. Third primary (ascendant) longest; 1st primary between 5th and 6th. Tail of twelve feathers, long and very much graduated.

Genus monotypic; found in the mountains of SE. Europe, Africa east to S. Arabia and the Himalayas.

188. **Himalayan Bearded Vulture** or **Lämmergeier**. *Gypætus barbatus aureus* (Hablizl)

Vultur aureus Hablizl, 1783, Neue Nord. Beytr., 4: 64

(Province of Gilan, northern Persia)

Gypætus hemachalanus Hutton, 1838, Jour. As. Soc. Bengal, 7: 22 (Himalayas)

Gypætus altaicus Sharpe, 1874, Cat. Bds. Brit. Mus., 1: 229 *ex* Gebler, 1840, Bull.

Soc. Acad. St. Petersb., 6: 292 (Altai)

Baker, FBI No. 1716, Vol. 5: 26

Plate 6, fig. 6, facing p. 112

LOCAL NAMES. *Argul* (Hindi, about Mussooree); *Okhâb* (Chamba). Commonly miscalled 'Golden Eagle'.

SIZE. Himalayan Griffon +, but less massive and with longer tail; length *c.* 122 cm. (*c.* 48 in.). Wing span (tip to tip) *c.* 275–285 cm. (9 ft. to 9 ft. 4 in.).

FIELD CHARACTERS. A handsome eagle-like vulture with feathered head and neck, and longish wedge-shaped tail.

Adult. *Above*, head and neck creamy or rusty white; rest of upperparts silvery grey and black, streaked with white. *Below*, pale rusty white. A tuft of black bristle-like feathers—the beard—pendant under chin and conspicuous in profile. Legs fully feathered. Sexes alike.

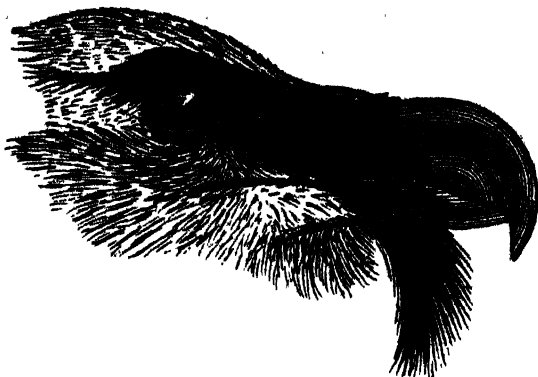
In overhead aspect like an oversize Neophron. Long and comparatively narrow pointed wings, and longish wedge-shaped tail readily distinguish it from Himalayan Griffon, and from eagles.

Young (immature). Very dark brown, with almost black head and black goatee as in adult.

STATUS, DISTRIBUTION and HABITAT. Resident. A purely northern mountain form, fairly common in Baluchistan and Sind, and throughout the Himalayas from NWFP, Ladakh and Kashmir east through Nepal and Bhutan

to NE. Assam. Also recorded in N. Cachar hills. Normally between c. 1200 and 4000 metres elevation; rarely lower. Observed by the Everest expeditions soaring at between 7200 and 7500 metres.

Extralimital. Mountains of SE. Europe (Alps etc.), islands in the Mediterranean Sea, east to N. China and south to S. Arabia (and the Himalayas) — Peters.



× c. $\frac{1}{2}$

GENERAL HABITS. Usually seen quartering the mountain slopes and valleys, sailing majestically on outstretched motionless wings with hardly ever a wing-beat, hugging the contours and cliff-faces or soaring at immense heights. A loud droning of the wings, as of some gigantic wasp, is heard as a bird sweeps past the observer, and also a peculiar *trrrrr* sound (produced by primaries?) as it sails low overhead. In spite of great size and weight, bird capable of taking off the ground without a preliminary run. Often scavenges around mountain villages and municipal refuse dumps at Himalayan hill stations and cantonments, walking about with an eagle-like gait and picking up scraps, or swooping from the air like a kite to snatch them in its talons. Its method of breaking large bones which, together with the marrow (?), form part of its normal diet is well known and reliably authenticated. The bone, which may be the femur of an ox, is carried up in the claws to a height of some 50 or 70 metres and dropped on rocks below — often at regular selected spots or ‘ossuaries’ — the bird retrieving the bone to repeat the process if necessary till it splinters, whereupon it will descend to the ground and leisurely swallow the pieces. On approach of the breeding season pairs indulge in spectacular aerobatics, flapping their wings, chasing one another, and indulging in mock fights. One bird will swoop at the other which dexterously turns over on its back to parry the attack with its talons. With claws thus interlocked and wings half-closed, the two tumble or ‘cart-wheel’ rapidly through space to the accompaniment of a sharp guttural *koolik, koolik*, separating only when a few metres from the ground. They may then either rise again to repeat the performance or soar aloft and sail away.

FOOD. Carrion and pieces of bone. Often feeds at wayside animal carcasses and refuse dumps in company with Griffons, Neophrons and ravens; but timid and keeping aloof until coast clear. In spite of allegations, never known to attack any living animal.

VOICE and CALLS. Normally silent except in courtship display, as above. Hungry nestling (about size of small goose) uttered 'a curious shrill squeak'; occasionally 'a kind of quack' when a few months older (Whistler).

BREEDING. Breeds at elevations between c. 1200 and 4200 metres; sometimes higher. *Season*, December to February/March. *Nest*, a huge pile of sticks along with quantities of miscellaneous rubbish such as sheep's wool, fragments of hairy mammal skins, and large desiccated bones. Placed on an inaccessible ledge often under a rock overhang, or in a natural recess in a sheer cliff-face. Each pair usually has two or three alternative nest sites used in irregular rotation. *Eggs*, normally 1 or 2; but three have been recorded. Pale creamy yellow or pale rusty orange to deep reddish buff, variably mottled or blotched with reddish brown. Average size of 60 eggs 85.0×67.4 mm. (Baker). Share of the sexes in the domestic chores, and period of incubation, unrecorded.

MUSEUM DIAGNOSIS. For details of plumage see Baker, loc. cit.; for description of chick in down and changes with growth Whistler 1912, JBNHS, 21: 663-5; P. T. Dodsworth 1914, *ibid.*, 22: 801.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	726-890	74-85	86-95	440-555 mm.
Mid toe and claw	95-102 mm.			(Baker)

COLOURS OF BARE PARTS. Iris: outer ring scarlet, inner ring khaki. 'Pale to blood-orange, the sclerotic membrane blood red' — Baker. Bill horny brown, greenish plumbeous at base, blackish at tip. Feet grey; claws plumbeous.

MISCELLANEOUS. Meat of the Lämmergeier highly prized by the hill people, and not only by the low castes; the birds are killed with spears at tethered chukor baits (! ?) — F. Stoliczka, 1868, *Jour. Asiat. Soc. Bengal*: 37.

Genus *Circus* Lacépède

Circus Lacépède, 1799, *Tabl. Ois.*: 4. Type, by subsequent designation, *Falco aeruginosus* Linnaeus (Lesson, *Man. d'Orn.*, 1: 105)

Contains slender, elegant, long-winged, long-tailed raptors — the harriers — readily distinguished by shape and flight. A more or less conspicuous ruff of close-set soft feathers extending across throat and up each side of neck behind ear-coverts. Bill weak and compressed; culmen curved from base to tip; a small festoon present. Nostril large, broadly oval, overhung by loreal bristles. Wing long and pointed: 3rd primary (ascendant) longest; 1st about equal to 6th or 7th. Tail long, square or slightly rounded. Tarsus long, slender, feathered next the thigh only; covered with transverse shields in front, smaller polygonal scales behind. Toes slender, with sharp well-curved claws.

Genus found throughout the temperate and tropical regions. Five species occur in our limits in winter; only one rarely breeding.

Key to the Species

		Page
A	Outer webs of 2nd, 3rd, and 4th primaries <i>only</i> , notched.....	1
B	Outer webs of 2nd to 5th primaries notched.....	2
1	Tarsus over 66 mm.....	<i>C. macourus</i> 319
	Tarsus under 66 mm.....	<i>C. pygargus</i> 321
2	Bill from cere to tip over 29 mm.....	<i>C. aeruginosus</i> 324
	Bill from cere to tip under 29 mm.....	a
a	Upperparts ashy.....	<i>C. cyaneus</i> (ad. ♂) 317
	Upperparts to rump black.....	<i>C. melanoleucos</i> (ad. ♂) 323
	Upperparts brown with paler edgings.....	I
I	Upper tail-coverts pure white.....	<i>C. cyaneus</i> (ad. ♀) 317
	Upper tail-coverts not all white.....	a ¹
a ¹	Coverts along forearm white or buff.....	<i>C. melanoleucos</i> (ad. ♀) 323
	Coverts along forearm brown.....	a ²
a ²	Abdomen buff with dark stripes.....	<i>C. cyaneus</i> (juv.) 317
	Abdomen rufous-brown.....	<i>C. melanoleucos</i> (juv.) 323

189. **Hen Harrier.** *Circus cyaneus cyaneus* (Linnaeus)*Falco cyaneus* Linnaeus, 1766, Syst. Nat., ed. 12, 1: 126(Europe, Africa = vicinity of London, England, *ex* Edwards, pl. 225)

Baker, FBI No. 1792, Vol. 5: 131

LOCAL NAMES. Same as for 190.

SIZE. Kite — ; slimmer. Length *c.* 46–54 cm. (18–21 in.).

FIELD CHARACTERS. Male (adult). Like Pale Harrier (190) but darker ashy grey above, this colour extending over chin, throat, and upper breast which are white in 190. Often a distinct brown-streaked white nuchal patch. Upper tail-coverts pure white *v.* banded grey and white in Pale.

In flight blunter, rounder black-tipped wings *v.* more pointed in Pale, is with a little practice a further and infallible differentiating character (Meinertzhagen).

Female. Dark brown above, brown-streaked below. Indistinguishable from Montagu's and not with certainty from Pale, but conspicuously broader white rump-patch suggestive. A light buff collar frequently visible as bird flies past.

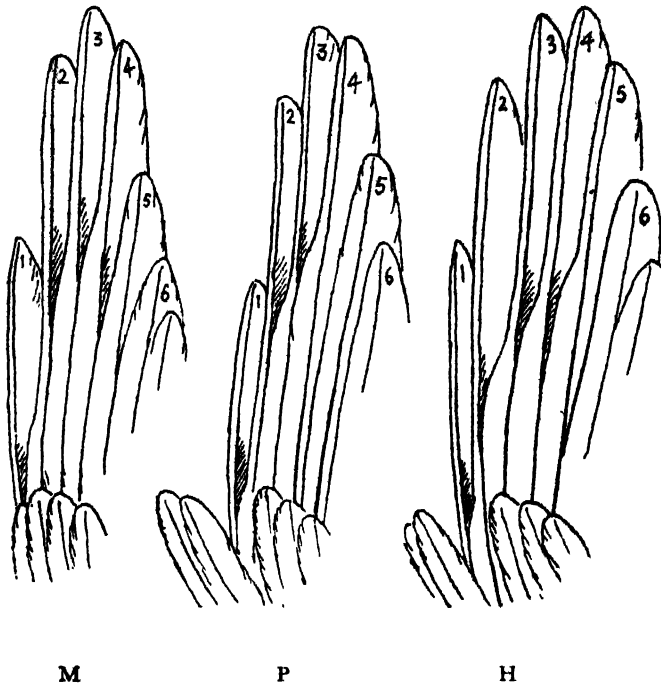
Young (immature). Underparts rufous-buff, broadly striated with dark brown. Ruff well developed.

STATUS, DISTRIBUTION and HABITAT. Rather uncommon winter visitor and/or passage migrant, September to April/May, in NW. Pakistan [Baluchistan (Quetta dist.) and NWFP (Rawalpindi, Chitral, Kohat dists.)] and northern India (Gilgit, Kashmir, Punjab, Himachal Pradesh, Nepal) east to Upper Assam (N. Lakhimpur dist.). Probably the commonest harrier in the Sikkim Himalayas. Affects open undulating plains and cultivated country, Himalayan foothills and up to *c.* 2500 metres elevation.

Extralimital. 'Breeds in Europe north to the Arctic Circle (casually further) and in Asia south of the tundra, east probably to the Lena River; south to

the Pyrenees, Italy, Turkestan, and Tibet. Winters in the region about the Mediterranean, NE. Africa, N. India, Burma, China, Japan (?) — Peters.

GENERAL HABITS. Very similar to those of the Pale Harrier (190), q.v. Perhaps somewhat more given to soaring. During spring and autumn migrations found at great heights in the Punjab Himalayas; observed at 5000 metres and above beating over the barren hillsides, chasing accentors and finches (Donald).



Primaries of (M) Montagu's Harrier (*Circus pygargus*), (P) Pale Harrier (*C. macrourus*), (H) Hen Harrier (*C. cyaneus*) to show differences in wing formula and emarginations. In P and H primary-coverts are pushed aside to show emargination of 2nd visible primary, which they normally conceal, whereas in M this emargination is exposed. 5th visible primary in M and P is not emarginated and short; in H it is emarginated and longer

FOOD. As of the genus: lizards, young rodents, sickly or nestling birds, grasshoppers, etc. Known to carry off snipe falling to shot. Among remains of small birds in stomachs of specimens, the following specifically identified: Common Babbler (*Turdoides caudatus*), Skylark (*Alauda* sp.) and Bustard Quail (*Turnix* sp.) — Whistler. One shot while carrying off a chicken (Biddulph); another seen demolishing a hoopoe (Stevens).

VOICE AND CALLS. Unrecorded. Very silent in winter; more vocal when breeding.

BREEDING. Extralimital. *Season*, May-June. *Nest*, on ground in heather, grass and reeds about swamps, or on exposed hillsides. *Eggs*, 6 to 8, white.

MUSEUM DIAGNOSIS. First 6 primaries in male black. Outer webs of 2nd to 5th quills (as.) notched; upper tail-coverts pure white in both sexes. For details of plumage etc. see Witherby 1939, 3: 69-70.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♂	341-357	23-25	69-74	210-221 mm.
♀ ♀	375-392	27-29	71-78	246-255 mm. (Baker)

COLOURS OF BARE PARTS: Iris ♂ ad. bright orange-yellow; ♀ ad. gamboge yellow; imm. brown. Rest as in 190.

190. Pale Harrier. *Circus macrourus* (S. G. Gmelin)

Falco macrourus S. G. Gmelin, 1770, Reise d. Russl., th. 1: 48

(Voronezh, southern Russia)

Baker FBI No. 1790, Vol. 5: 129

Plate 10, fig. 10, facing p. 192

LOCAL NAMES. *Dāstmāl*, *Girgit mār*, *Pāttai* (Hindi); *Māth cheel* (Bengal); *Tella chappa gādda*, *Pillī gādda* (Telugu); *Poonāi pāṛindū* (Tamil); *Kurrulu goya*, *Ukassa* (Sinhala); *Daoling wahlai* (Cachari).

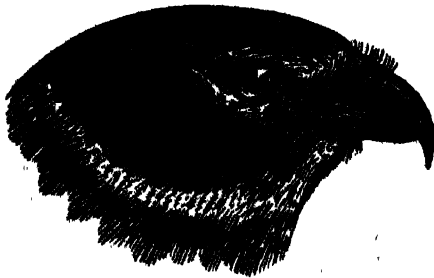
SIZE. Kite - ; slimmer; length *c.* 46-51 cm. (18-20 in.).

FIELD CHARACTERS. A slender, elegant grey-and-white hawk.

Male (adult). Pale ashy grey above, pure white below, with black tips to the long narrow pointed wings. The last particularly conspicuous in the low sailing flight when wings held in a flat V above plane of body. Tail relatively long, white cross-barred with grey.

Differentiated from male Hen Harrier (189) by paler grey coloration (*v.* bluish grey) with pure white underparts and less pronounced rump patch (greyish- or brownish white *v.* broad *pure* white). From Montagu's (191) by being likewise paler grey and lacking the diagnostic black transverse wing-bar across secondaries.

Female. Umber brown, with prominent pale rufous owl-like ruff; inseparable from Montagu's in the field. Females of both these species only doubtfully distinguishable from ♀ Hen Harrier by smaller, less prominent white rump patch.



♀ *x c. 1/2*

Young (immature). *Above*, brown like female but the feathers margined with pale rufous. Ruff very distinct, unstreaked. Upper tail-coverts pure white. *Below*, rufous-buff with faint darker rufous shafts on breast and flanks.

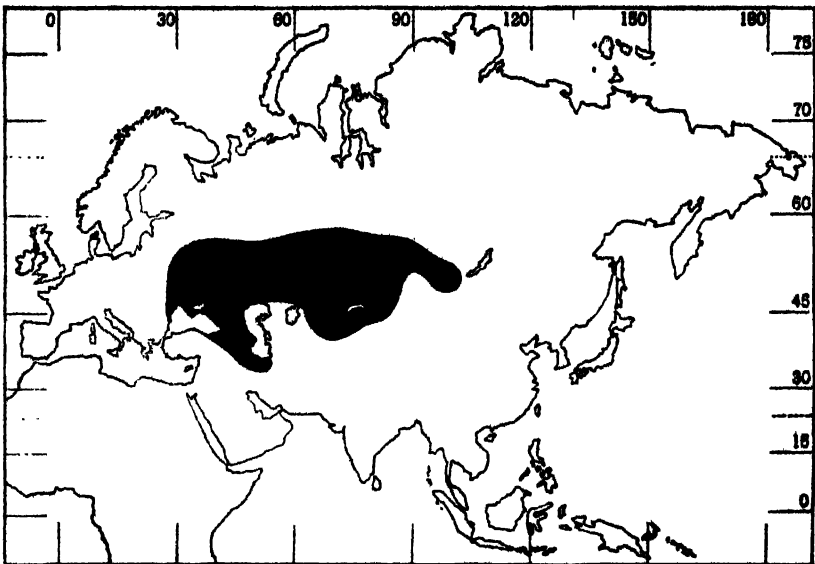
Indistinguishable with certainty from females and immatures of 189 and 191.

STATUS, DISTRIBUTION and HABITAT. Common winter visitor to the entire Indian Union including Andaman, Nicobar (?) and Laccadive islands.

Both Pakistans, Nepal, Ceylon, Maldives (?). From plains level up to *c.* 3000 metres or higher in the Himalayas, and to the tops of the highest peninsular hills (Dodabetta, Nilgiris, *c.* 2600 m.; Anaimudi, Anaimalais, *c.* 2700 m.). In Ceylon a few non-breeding birds remain throughout summer (Phillips). Affects plateaux and undulating foothills country—open grassy hillsides, rolling downland, cultivation, stony semi-desert and scrub. Avoids wooded tracts.

Extralimital. 'Breeds from the Baltic Sea provinces east to Tarbagatai and the Tian Shans, south to Rumania, S. Russia and Ferghana. Winters in Africa from the Sudan to Cape Province; India, Ceylon, and Burma' (Peters).

Circus macrourus



■ Breeding range

MIGRATION. No ringing records. Influx commences in N. India already by end August, the birds spreading to S. India and Ceylon by October/November; mostly leaving again March/April. Autumn passage through NWFP (Kohat dist.) September to end November; spring passage February till May (Whitehead & Magrath). Very common in and around Quetta during spring passage between 15 March and 15 April (Marshall). Mostly gone from N. India by end April. On migration passage congregates to pass the night dotted about individually in a ploughed field or bare open ground—a stream of single birds arriving at dusk and on into darkness, and resuming the journey before daybreak. They do not fly in a flock but strung out individually at varying distances behind one another, sailing steadily or with purposeful wing-beats in a fixed direction, higher up than in normal foraging; occasionally descending lower to hunt as they work their way towards their destination.



PLATE 17

1 *Phodilus b. saturatus*, Bay Owl (609). 2 *Bubo n. nipalensis*, Forest Eagle-Owl (628). 3 *Otus b. lettua*, Collared Scops Owl (623). 4 *Glaucidium b. brodiei*, Collared Pigmy Owllet (635). 5 *Hieraaetus f. fasciatus*, Bonelli's Hawk-Eagle (163). 6 *Ictinaetus m. perniger*, Black Eagle (172). 7 *Microhierax caerulescens*, Redbreasted Falconet (204).

GENERAL HABITS. Not gregarious. Single birds spend the day tirelessly quartering the countryside a metre or two above the ground, sailing lightly and gracefully on outspread motionless wings, banking to skirt a bush, 'dipping to the hollow and rising to the mound', or skimming the tops of the standing crops and grass. From time to time the bird checks dead in its flight, wheeling almost double upon itself, swinging out its legs and pouncing noiselessly on some unsuspecting quarry. If successful, it alights to dispose of the victim on the spot before resuming the beat. When sated, rests on the bare ground or on a clod or mound in preference to a bush or tree. Roosts at night in the open, often in sizeable congregations and in company with other harrier species in a ploughed field, fallow land, or grassy swamp. The birds do not sleep huddled together but sit dotted about individually a few metres from one another — sometimes each in a regular 'form' of pressed-down grass as made by partridges.

FOOD. Frogs, lizards, field mice, sickly or young ground-nesting birds, grasshoppers, etc. A *Turnix* and remains of a sandgrouse (or partridge?) taken among stomach contents of a specimen. No fish recorded in India, but on migration across Red Sea from Africa to Europe harriers (species?) observed picking up flying fishes in their talons as they skimmed the water, and eating them (W. P. Lowe 1940, *Ibis*: 333).

VOICE and CALLS. Unrecorded. Very silent in winter.

BREEDING. Extralimital. *Nest*, a bed of leaves and grass in a natural hollow in the ground on a dry open meadow or on the edge of a swamp. *Eggs*, 4 or 5 white, usually spotted and blotched with reddish brown.

MUSEUM DIAGNOSIS. Outer webs of 2nd, 3rd, and 4th quills (as.) *only* notched. Tarsus over 65 mm. long. For details of plumage etc. see Witherby 1939, 3: 71-2.

MEASUREMENTS

	Wing	Bill (from skull)	Tarsus	Tail
♂ ♂	332-360	25-27	66-70	201-222 mm.
♀ ♀	345-386	27-31	67-78	222-247 mm. (SA)

COLOURS OF BARE PARTS. Iris a dull greenish yellow or yellow; juv. brown. Bill horny black, plumbeous at base of lower mandible; cere and gape lemon-yellow; mouth greyish pink. Legs and feet pale chrome-yellow; claws black.

191. Montagu's Harrier. *Circus pygargus* (Linnaeus)

Falco Pygargus Linnaeus, 1758, Syst. Nat., ed. 10, 1: 89

(Europe = England, *ex* Albin)

Baker, FBI No. 1791, Vol. 5: 130

LOCAL NAMES. As for 190.

SIZE. Kite — ; slimmer; length c. 46-49 cm. (18-19 in.).

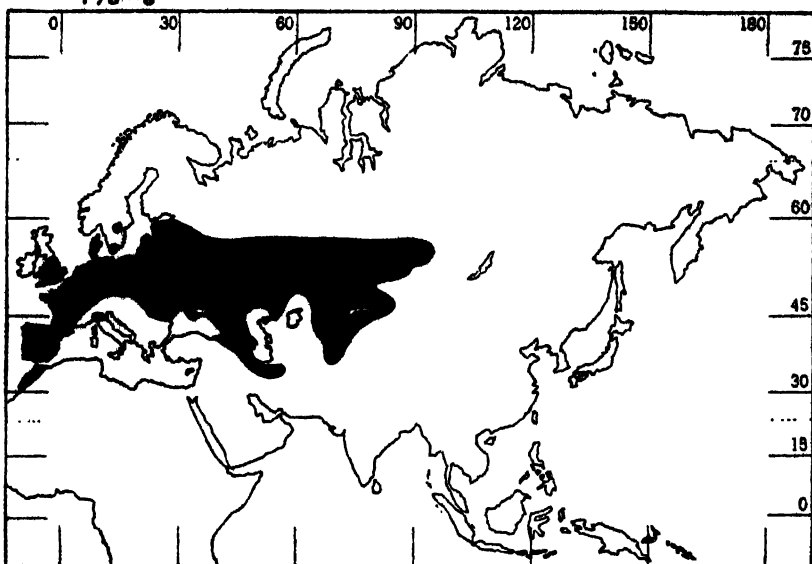
FIELD CHARACTERS. Male (adult). Like the Pale Harrier but upperparts darker ashy grey (more or less tinged with brown), the grey extending to throat and breast. Rest of underparts white with chestnut shaft-stripes. A narrow black transverse wing-bar across secondaries diagnostic at rest and in flight. Rump greyish.

Female. Indistinguishable in the field from ♀ *Pale*; from ♀ *Hen Harrier* only doubtfully by slightly narrower white rump-patch.

Young (immature). Somewhat darker and more richly coloured than immature *Pale Harrier*, with the ruff indistinct; but not separable from it in the field with certainty.

STATUS, DISTRIBUTION and HABITAT. Winter visitor. Perhaps slightly less common than *Pale Harrier* overall, but equally widely distributed over the subcontinent. Occurs also in the Andaman and Laccadive islands, Ceylon and the Maldives. Affects identical facies to 190.

Circus pygargus



■ Breeding range

Extralimital. 'Breeds in England and through N. Europe (south of lat. 57°N.) and Asia to Turkestan, Altai, and NW. Mongolia; south to Spain. NW. Africa, Italy and Rumania. Winters from Palestine to S. Africa, India, Ceylon, and Assam' (Peters).

MIGRATION. As in 190. No ringing records.

GENERAL HABITS. Same as the *Pale Harrier*'s, the two frequently confused in the field by observers.

FOOD. As in 190.

VOICE and CALLS. Unrecorded. Very silent in winter.

BREEDING. Extralimital. *Nest* of grass and reeds on the ground in a cornfield or on a bed of rushes near a swamp. *Eggs*, 4 to 6, bluish white unmarked, or faintly blotched with light red.

MUSEUM DIAGNOSIS. Outer webs of 2nd, 3rd, and 4th primaries (as.) *only* notched, as in 190. Most readily distinguished from *Pale Harrier* by shorter tarsus — *under* 65 mm. long. For details of plumages etc. see Witherby 1939, 3: 63-6.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	344-395	23-25	c. 55-65	213-241 mm. (Baker)

The sexes do not differ in size.

COLOURS OF BARE PARTS. As in Pale Harrier.

192. **Pied Harrier.** *Circus melanoleucos* (Pennant)

Falco melanoleucos Pennant, 1769, Ind. Zool.: 12, pl. 2 (Ceylon)

Baker, FBI No. 1793, Vol. 5: 132

Plate 11, fig. 10, facing p. 208

LOCAL NAMES. *Pahātai* (Hindi); *Āblāk petāha* (Nepal).

SIZE. Kite — ; slimmer; length c. 46-49 cm. (18-19 in.).

FIELD CHARACTERS. Male (adult). A slim, handsome, black-and-white hawk. Head, mantle, throat, and breast black. Rest of underparts and rump white. Tail grey. Wings silvery grey broadly tipped with black (primaries) and with a black band across them above (median wing-coverts).

Female. Dark brown above, pale fulvous-rufous below, with whitish rump and some white on the nape. Doubtfully distinguishable in the field from females of Pale and Montagu's harriers except with much practice, by its blunter, less pointed wings (as in Hen Harrier), and somewhat heavier flight when flapping.

Young (immature). Above, darker than female with rufous edges to head and neck feathers. Whitish nuchal patch and ruff prominent. But field identification with certainty impossible.

STATUS, DISTRIBUTION and HABITAT. Chiefly winter visitor to the eastern parts of the subcontinent. Quite common in Manipur, Assam (where it occasionally breeds), East Pakistan, W. Bengal, Bihar, Orissa and decreasingly so down the eastern side of the Peninsula; in small numbers to Ceylon. Sparingly in Kerala, W. Madras (Nilgiri and Palni hills), Mysore (Londa dist.), Madhya Pradesh (esp. eastern districts, e.g. Balaghat, Bhandara, Bastar). Rare straggler or vagrant in Andhra Pradesh (Warangal dist.) and Maharashtra (Bombay environs). Not recorded north of Bombay in W. India, nor west of Nepal terai and Gorakhpur dist. in Uttar Pradesh, though putatively seen at Lahore (Currie). Affects open expanses of grassland, plain and hill (to c. 2100 metres — Kodaikanal). Also paddy-fields and stubbles, and grassy margins of jheels.

Extralimital. 'Breeds from Lake Baikal east to Ussuriland and south to Mongolia, N. China and the Amur region. Winters in E. India, Burma, and S. China; Indochinese countries, Borneo and the Philippines' — Peters. Breeds sparingly also in Assam and Burma.

GENERAL HABITS. Very similar to the Pale Harrier, q.v. Systematically quarters the ground for food in low sailing flight. Sometimes hovers stationary for a few moments a metre or so above standing crops or reeds to investigate, either pouncing on a quarry or resuming the beat. 'When not hunting, male

always soared with tail tightly closed; female with tail spread out' (Stanford).

FOOD. As of the other harriers — frogs, lizards, mice, grasshoppers, etc. Occasionally takes sickly birds or nestlings from ground nests, but normally small birds do not regard it as a potential danger. Recorded eating a small snake, and robbing young from nest of Pied Myna (*Sturnus contra*).

VOICE and CALLS. Normally silent. Unrecorded except for a loud six-fold 'chacking', as of a magpie, uttered by female when nest containing young approached (Stanford).

BREEDING. Mainly extralimital, but a few birds breed in the uplands of Assam, e.g. in Dibrugarh dist. (Cripps), and evidently also in Cachar at c. 600–900 metres (Baker), as recently found to do in Burma (Stanford). *Season*, c. April to July (?). *Nest*, a rough pad of grasses placed a few centimetres above ground amongst pressed-down growing stems, in an open expanse of grassland. *Eggs*, 4 to 6 (in Siberia), white, sometimes faintly flecked with reddish. Average size of 28 Siberian eggs 43·6 × 34·5 mm. (Baker).

MUSEUM DIAGNOSIS. See key to the species. Outer webs of 2nd to 5th primaries (as.) notched. For details of plumage Baker, loc. cit.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	344–367	22–24	76–80	197–217 mm.
♀♀	366–387	25–27	81–88	211–240 mm. (Baker)

COLOURS OF BARE PARTS. Iris, ♂ ad. bright lemon-yellow. Bill, upper mandible and terminal half of lower blackish brown; rest of lower mandible plumbeous tinged with greenish yellow at base; cere greenish yellow. Legs and feet orange-yellow (in ♀ somewhat duller and paler); claws black.

CIRCUS AERUGINOSUS (Linnaeus)

Key to the Subspecies

Abdomen dark or rufous-brown or rufous with dark stripes *C. a. aeruginosus*
 Abdomen plain white, or buff with dark shaft-stripes *C. a. spilonotus*

193. Marsh Harrier. *Circus aeruginosus aeruginosus* (Linnaeus)

Falco aeruginosus Linnaeus, 1758, Syst. Nat., ed. 10, 1: 91

(Europe, restricted type locality, Sweden)

Baker, FBI No. 1794, Vol. 5: 134

Plate 10, fig. 11, facing p. 192

LOCAL NAMES. *Kutar*, *Kulesir*, *Safed sira* (Hindi); *Pān cheel*, *Tika bauri* (Bengal); *Ukussa*, *Kurulla goya* (Sinhala); *Poonāi pārindū* (Tamil); *Karitappi* (Malayalam).

SIZE. Kite — ; length c. 54–59 cm. (21–23 in.).

FIELD CHARACTERS. A predominantly marsh-frequenting harrier, more heavily built than others of the genus, with broader and less pointed wings.

Male (adult). Dark brown with pale rufous head, neck and breast; dark rufous below. With silvery grey tail and black-tipped silvery grey wings.

Female (adult) and Young (immature). Rather like a dark chocolate-brown Pariah Kite but slimmer, with a round (not forked) tail, and usually a creamy buff cap on head and buff leading edge to wing at shoulders.

The majority of birds seen in India are in this plumage.

STATUS, DISTRIBUTION and HABITAT. Winter visitor, September to April, practically throughout the Indian Union, Andaman, Nicobar (?) and Laccadive (?) islands. Both Pakistans; Nepal. Chiefly low country and to c. 2000 metres elevation. Ceylon (all zones); Maldive Islands. In Ceylon some non-breeding birds loiter throughout the summer (Phillips). This is doubtless also the explanation for the young birds occasionally seen in Kashmir and elsewhere in northern India as late (or as early?) as July. Affects jheels and marshes, flooded paddyfields, etc.

Extralimital. 'Breeds from S. Sweden and Denmark east to the Yenesei, south to the Mediterranean, Turkestan, and Mongolia. In winter south to Africa, India, Malay Peninsula, S. China, Japan, and Philippines' (Peters).

MIGRATION. No ringing data.

GENERAL HABITS. As of the other harriers, e.g. Pale Harrier (q.v.) but more addicted to marshland and jheels. Sails leisurely a few metres above the reed-beds on motionless wings, occasionally boosted by a few heavy flaps, jinking suddenly in its flight from time to time and dropping into the reeds to seize some prey. Unlike the other harriers spends a considerable part of its time sitting about on the ground, on a canal bank, mound, or snag, and is also more given to soaring aloft in the sky. In this the wings are held in a wide V above the plane of the body. It is notorious for its habit of making off with wildfowl — sometimes as large and heavy as itself — falling to a sportsman's gun with the utmost audacity, regardless of his shouts and gesticulations.

FOOD. Frogs, fish, field mice and voles, weakling or wounded birds, large insects. Among stomach contents remains of lark (*Calandrella*) and redstart (*Phoenicurus*) have been specifically identified. Observed to take an apparently unwounded moorhen (*Gallinula chloropus*) among reeds by pouncing on it repeatedly from the air (SA); also feeding on carrion (D'Abreu).

VOICE and CALLS. Very silent. Unrecorded in winter.

BREEDING. Extralimital. *Season*, April to June. *Nest*, a mass of reeds and rushes lined with grass; placed on the ground near a marsh. *Eggs*, 4-6, unmarked white. A pair recorded to have bred successfully at Malezai, N. Baluchistan, in 1940 (A. F. P. Christison). Presumptive or reported occasional breeding in Kashmir and elsewhere in N. India not yet proven.

MUSEUM DIAGNOSIS. Outer webs of 2nd to 5th quills (inclusive) notched. Bill from cere to tip usually over 29 mm. Abdomen dark or rufous-brown, or rufous with dark stripes. For details of plumage etc. see Baker, loc. cit.; Witherby 1939, 3: 59-61.

MEASUREMENTS

	Wing	Bill (from cere(?))	Tarsus	Tail
♂♂	385-405	28-30	80-85	234-245 mm.
♀♀	390-430	28-31	85-90	238-258 mm.
				(Baker)

In 2 ♀♀ measured by SA and H. Whistler bill (from skull) 36, 43 mm.; tarsus 91, 96 mm.

COLOURS OF BARE PARTS. Iris ad. hazel brown to dull golden; imm. brown. Bill horny black, plumbeous or greenish yellow at base and chin; cere yellow. Legs and feet yellow to orange-yellow; claws horny black.

194. Eastern Marsh Harrier or Striped Harrier. *Circus aeruginosus spilonotus* Kaup

Circus spilonotus Kaup, 1847, Isis von Oken, col. 953 (Asia)
Baker, FBI No. 1795, Vol. 5: 135

LOCAL NAMES. Unrecorded.

SIZE. Kite — ; about same as 193.

FIELD CHARACTERS. Male (adult). Head black, mantle black with some white mottling. Nape and throat white, heavily streaked with black; breast and abdomen all white; rump white, lightly barred with black. Tail and wings light grey; flight feathers blackish; underwing white.

Female. Dark brown, buffy white on head, throat, and nape, streaked with dark brown on nape and lower throat. Underwing dark; rump not noticeably lighter than back.

Both sexes readily distinguished from 193 by conspicuously striped nape and throat, and white or whitish abdomen.

Young (immature). 'Brown above, pale rufous below, streaked with rufous brown; rump whitish' (Delacour & Mayr).

STATUS, DISTRIBUTION and HABITAT. An eastern winter visitor, recorded only from Assam (Cachar) and Manipur. Affects marshland.

GENERAL HABITS. As in 193.

FOOD. Presumably as in the Marsh Harrier; not specifically recorded.

VOICE and CALLS. Unrecorded.

BREEDING. Extralimital. *Nest* and *eggs* similar to those of 193.

MUSEUM DIAGNOSIS. Outer webs of 2nd to 5th primaries (inclusive) notched. Bill from cere to tip over 29 mm. Abdomen plain white or buff with dark shaft-stripes. For details of plumage see Baker, loc. cit.

MEASUREMENTS

	Wing	Bill (from cere(?))	Tarsus	Tail
♂	384	29	91	224 mm.
♀ ♀	406-420	31-32	91-95	244-256 mm. (Baker)

Wing ♂♂ 385-425; ♀♀ 400-443 mm. (Kirke-Swann).

COLOURS OF BARE PARTS. Iris golden yellow. Bill deep slaty, black at tip yellowish at base and gape; cere dull yellow. Legs and feet pale yellow.

Genus CIRCAETUS Vieillot

Circastus Vieillot, 1816, Analyse : 23. Type, by monotypy, 'Jean-le-Blanc' Buffon
= *Falco gallicus* Gmelin

Bill moderate, greatly hooked and with the culmen much rounded. Nostril oval and slightly oblique, the loreal bristles growing over it in an upwards direction. Wing long: 4th primary (ascendant) longest; 3rd and 5th only slightly shorter. Primaries exceed secondaries by more than length of tarsus. Tarsi long, unfeathered

except for *c.* 25 mm. next the tibia; covered all round with small ill-defined hexagonal imbricate scales. Toes short; the inner and outer toes about equal in length. Claws short and not much curved.

No crest, but feathers of nape lengthened and lanceolate.

Genus chiefly African; one species extending to Europe and Asia as far east and south as India.

195. **Short-toed Eagle.** *Circetus gallicus gallicus* (Gmelin)

Accipiter ferox, S. G. Gmelin, 1771, Novi Comm. Acad. Petrop., 15: 422, pl. 10 (Astrakan, S. Russia). (Unidentifiable *vide* Mayr. E., 1944, Emu, 43: 303).

Falco gallicus Gmelin, 1788, Syst. Nat., 1(1): 259 (France)

Baker, FBI No. 1764, Vol. 5: 93

Plate 14, fig. 4, facing p. 256

LOCAL NAMES. *Saampmaar* (Hindi); *Sāpmaril* (Bengal); *Malpatar* (Kannada); *Pāmūlā gāddā* (Telugu); *Onān koththi*, *Pāmbu pārāndū* (Tamil); *Rawal* (Wagri); *Konda-tele* (Yerukali).

SIZE. Kite +; length *c.* 63–68 cm. (25–27 in.).

FIELD CHARACTERS. A thick-set brown and white eagle with large greyish owl-like head. *Above*, earthy brown. *Below* chin, throat, and upper breast paler earthy brown; rest of underparts white, barred with pale brown. Tail with 3 (or 4) dark bands, the terminal one broadest. Sexes alike; female larger.

At close range and through glasses unfeathered legs, thick frowzy head with upwardly directed bristly feathers on face, and wings reaching to end of tail, are diagnostic pointers when bird at rest.

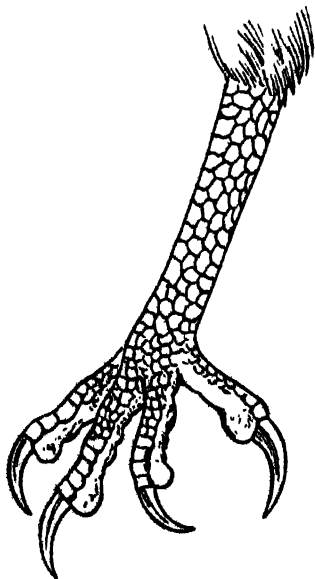
In overhead aspect thick-set outline, silvery body and underwing contrasting with darker head and throat, blackish primaries, and dark crossbands in tail are suggestive. Wings held in the same plane as body.

Young (immature). Confusingly variable in coloration: from head and neck almost white to brown, and from underparts whitish buff with browner chin, throat, and breast, to white spotted or striped with brown, and other intermediate phases.

STATUS, DISTRIBUTION and HABITAT. Resident. W. Pakistan, Nepal and practically throughout the Indian Union (except

Assam), from *c.* 1000 metres elevation in the Himalayas south. Has been observed as high as *c.* 2300 metres (Dharamsala — Donald). Not in Ceylon, or E. Pakistan (?). Affects open cultivated plains, stony deciduous scrub and foothills country, and semi-desert. Observed at Kodaikanal, *c.* 2100 m.

Extralimital. Also breeds from C. Europe east to Turkestan and Mongolia south to N. Africa, Persia and N. China. Migratory in northern parts of its range. Winters chiefly in NE. Africa (Peters).



x c. 1/2

GENERAL HABITS. Usually seen singly soaring and circling high up in the blue, or quartering the ground on outstretched motionless wings like a harrier, 15 to 20 metres above scrub jungle and fields, for food. The sailing flight is frequently interrupted by bouts of cumbrous hovering to investigate prospects below more closely. Against strong wind will remain stationary for minutes merely with slight manipulation in angle of wings and tail. This often followed by a closing of the wings and spectacular, almost vertical dive at high velocity, pulling out when close to the ground and pouncing on prey. The great heights from which these dives are executed — in one case well over 400 metres — bespeaks a phenomenally keen eyesight for the bird. Sometimes surveys its surroundings from perch on tree-top or stake, swooping on any prey that comes into view; or walks about on the ground like a buzzard picking up grasshopper nymphs, termites, etc. One individual overhead when fired at and peppered with small shot suddenly jinked and disgorged a 30 cm. long snake, but promptly retrieved it in its talons in mid-air and complacently flew on despite further peppering!

During breeding season much given to circling aloft in pairs and noisily calling; and to remarkable tumbling and darting aerobatics.

FOOD. Largely snakes including poisonous ones, and some of considerable size (a *Ptyas mucosus* 150–180 cm. long recorded). The reptiles apparently killed by seizing at the head and neck, the wriggling body often winding itself round parts of the bird during the struggle. Among the species identified in crops is *Psammophis condanarus*, a snake of which the first ever record for Mysore was obtained *via* a Short-toed Eagle! Also takes lizards (including *Varanus*), frogs, field rats, disabled birds and large insects, etc.

VOICE and CALLS. A loud, screaming, plaintive, rather kite-like cry *pieeou, pieeou* uttered chiefly on the wing, and commonly in the breeding season.

BREEDING. *Season*, December to March. *Nest*, comparatively small for such a large eagle, of sticks and twigs with a deepish central depression sometimes lined with a little grass. Built in or at the top of a moderate sized tree — neem (*Melia*), babool (*Acacia*), kandi (*Prosopis*), sheesham (*Dalbergia*), or other — standing in open country. Rarely on the ledge of a cliff or steep river-bank. *Egg*, invariably a singleton in India — in Europe frequently 2 — pure white. Average size of 38 Indian-taken eggs 73.5×58.4 mm. (Baker). Share of the sexes in nest-building unrecorded in India. Incubation chiefly by female who is a very close sitter. Both parents feed the young.

Incubation period in Europe *c.* 47 days; young flies from nest in 70–75 days (*Alauda*, 21: 86–127).

MUSEUM DIAGNOSIS. See under Genus. Toes and claws markedly short in proportion to the bird. For details of plumages see Baker, loc. cit.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	520–536	40–43	—	252–288 mm.
♀♀	530–571	40–43	92–97	287–330 mm.
Bill from skull ♂♂ 45–46, ♀♀ 47–53 mm.; tarsus ♂♂ 93–98, ♀♀ 94–96 mm. (SA).				

COLOURS OF BARE PARTS. Iris yellow or bright orange-yellow. Bill pale greyish blue, darkest at tip; cere whitish or pale plumbeous grey. Legs and feet dirty yellowish white to greyish brown; claws black.

Genus *SPILORNIS* G. R. Gray

Spilornis G. R. Gray, 1840, List Gen. Birds: 3. Type, by original designation,

Falco bido Horsfield (*vide* Stresemann, E., 1959, Jour. f. Orn., 100: 35)

Haematornis Vigors, March 1832 (1831), Proc. zool. Soc. London, pt. 1: 170.

Not *Haematornis* Swainson, Feb. 1832 (Turdidae).

Cf. Meise, W., 1939, J. f. O., 87: 65-74.

Distinguished from other Indian accipitrine genera by having a broad nuchal crest covering the whole nape. Coloration also peculiar, brown both above and below in adults, lower plumage ocellated with round white spots. Bill rather long, well hooked; festoon on upper mandible obsolete or wanting. Nostrils oval, oblique; lores nearly naked. Wings short and rounded; 4th or 5th primary (as.) longest. Tarsus (naked, covered with hexagonal scales), toes, and claws as in *Circus*.

Genus confined to Oriental Region. One species occurs within our limits.

SPILORNIS CHEELA (Latham)

Key to the Subspecies

		Page
A	Pale wing-bar next to tips of primaries much narrower than dark bars on either side of it.....	<i>S. c. elgini</i> 333
B	Pale wing-bar next to tips of primaries broader than the adjoining dark interspace.....	1
1	Wing under 260 mm.....	<i>S. c. klossi</i> 335
	Wing over 260 mm. but under 300 mm.....	<i>S. c. minimus</i> 334
	Wing over 300 mm. but under 405 mm.....	<i>S. c. spilogaster</i> 332
	Wing over 405 mm.....	a
a	Tail in adults with two broad pale bands.....	<i>S. c. melanotis</i> 331
	Tail in adults with one broad band of white or pale brown.....	I
I	Darker; white spots on lower plumage with conspicuous black spots on either side.....	<i>S. c. cheela</i> 329
	Paler; white spots larger but with less conspicuous black spots on either side.....	<i>S. c. burmanicus</i> 333

196. Crested Serpent Eagle. *Spilornis cheela cheela* (Latham)

Falco Cheela Latham, 1790, Index Orn., 1: 14 (India = Lucknow)

Baker FBI No. 1765, Vol. 5: 96

LOCAL NAMES. *Furj bāj*, *Dōgra cheel* (Hindi, Saharanpur); *Tilaj bāj*, *Sabchur* (Bengal); *Sin* (Assam).

SIZE. Kite +; length c. 74 cm. (29 in.).

FIELD CHARACTERS. A large dark brown eagle with a full, round black-and-white nuchal crest (very prominent when erected), a conspicuous yellow patch at base of bill (cere and lores), and unfeathered yellow legs. Underparts paler brown, ocellated and finely barred with white and blackish. Sexes alike, but considerable individual colour variation consequent on age.

In overhead aspect brown coloration, very broad rounded wings with the characteristic markings, held far back and on same plane as body in sailing flight, together with the distinctive 3- or 4-noted screaming call assist identification. Underwing pattern as follows: a narrow black border with a broad white band behind it running across the primaries and along the entire trailing edge, with narrower concentric parallel black-and-white bands before it. Flight very like a hawk-eagle's (*Spizaetus*). A broad whitish band across dark tail (not expanded in flight) and another ill-defined one near its base are further pointers.



× c. 1

Young (immature). *Above*, head, nape, and crest buffy or fulvous white with blackish tips to the feathers. Upperparts paler brown than in adult, scalloped with buffy white. Tail multi-banded dark and white brown. *Below*, buffy whitish, with sparse, irregular brown drops and streaks on breast and flanks. General colour pattern reminiscent of Greenland Falcon (*Falco rusticolus*).

STATUS, DISTRIBUTION and HABITAT. Resident, possibly subject to some local migration or wandering, as suggested by reports of seasonal commonness and rarity and the finding of occasional specimens of extralimital races in different parts of the country. W. Pakistan and N. India from Sind, NWFP, and Kashmir, through Nepal (where observed up to 3050 m. alt. in Gandak-Kosi watershed) to Assam north of Brahmaputra river. Gangetic Plain, foothills and normally up to c. 2000 m. in the Himalayas. Affects well-wooded well-watered country.

GENERAL HABITS. In effect the ecological counterpart in well-wooded biotope of the closely related Short-toed Eagle (*Circaetus gallicus*) of semi-desert areas. Keeps singly, or more usually in pairs, to jungle-clad ravines, wooded streams, and the edge of forest clearings and cultivation, perched bolt upright in the top of a lofty tree, partly concealed by the foliage, whence it can command a clear view of the surroundings for movements of prey. When alarmed the nuchal crest is erected 'so as to frame the face with a beautiful black and white ruff' (Deignan). Also commonly seen soaring and circling above the forest canopy, often at immense heights, uttering its characteristic screaming whistles which clearly proclaim its identity even when the bird itself is a mere speck in the heavens. In the breeding season pairs become particularly noisy and are much given to darting and tumbling acrobatic displays; sometimes three birds thus engaged in some form of 'triangular' courtship.

FOOD. Principally snakes, frogs, lizards, field rats and mice, maimed or sickly birds. Crabs, and 'an eel about a foot long' have been recorded. In spite of alleged destruction to game birds, it seldom if ever takes a healthy partridge or pheasant; occasionally domestic chickens.

VOICE and CALLS. Loud, high-pitched, prolonged whistling screams *kee-kee-kee* or *kek-kek-kek-keee* while soaring — sometimes also from perch. Usually prefaced by a short double *whi-whi*, or three short notes like *pu-pu-pu*, quickly repeated in undertone and audible only at close range.

BREEDING. *Season*, in the plains chiefly February-March; in the hills March-May. *Nest*, a large structure of sticks and twigs, sometimes lined with green leaves. Built high up in a tree in or near a forest clearing, preferably close to a stream. *Egg*, invariably a singleton, handsome, and with a wide range of colour and markings, mostly creamy or yellowish white boldly blotched with reddish brown. Average size of 16 eggs 71.8×56.2 mm. (Baker). Both birds share in nest-building, but apparently the female alone incubates. Period unrecorded.

MUSEUM DIAGNOSIS. The nominate race *cheela* (northernmost) is larger and darker than the other races. Chin and throat blackish; breast somewhat barred; white ocelli on lower plumage with conspicuous black spots on either side. Tail in adults with one broad almost pure white band. For details of plumage see Baker, loc. cit.

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	468-507	41-45	100-102	295-315 mm. (Baker)

For Himalayan birds Kirke-Swann gives Wing ♂♂ 500-510; ♀♀ 495-532 mm. For birds from the Punjab foothills:

		(from skull)		
3 ad. ♂♂	472-479	42-50	—	296-305 mm.
2 ad. ♀♀	482-484	c. 48	—	299-304 mm. (Whistler)

COLOURS OF BARE PARTS. Iris golden yellow. Bill slaty blue, blackish on culmen and tip; cere and lores yellow, brighter in breeding season. Legs and feet dull yellow; claws black.

197. **Lesser or Peninsular Crested Serpent Eagle.** *Spilornis cheela melanotis* (Jerdon)

Buteo melanotis Jerdon, 1844, Madras Jour. Lit. Sci., 13: 166

(At the foot of the Nilgiris)

Falco albidus Temminck, 1820, Planch. Color. d'Ois., 4: pl. 19 (Pondicherry). Not

Falco albidus Gmelin, 1788: 267

Spilornis minor Hume, 1873, Nests & Eggs of Indian Birds: 42

Baker, FBI No. 1766, Vol. 5: 98

Plate 15, fig. 2, facing p. 272

LOCAL NAMES. *Murayala* (Marathi); *Chotaliyo sâpmâr* (Gujarati); *Nälla pâmûla gâddâ* (Telugu); *Botta genda* (Gondi); *Goom* (Kannada); *Chutti-parandu* (Malayalam).

SIZE. Kite+; length c. 74 cm. (29 in.).

FIELD CHARACTERS. Same as for 196; somewhat smaller. Tail in adults with two broad pale bands instead of one, but the second not always very distinct. See Museum Diagnosis.

STATUS, DISTRIBUTION and HABITAT. Resident. Peninsular India south of the Gangetic Plain, arbitrarily south of lat. 25°N., from Gujarat eastward to Bengal. Affects well-watered wooded plains and foothills country.

GENERAL HABITS. As in the northern race (196).

FOOD, VOICE and CALLS. Ditto.

BREEDING. *Season*, December to March. *Nest*, site and *egg* as in 196. Average size of 36 eggs 65.7 × 50.9 mm. (Baker).

MUSEUM DIAGNOSIS. Chin and throat usually not blackish; breast generally uniform unbarred; tail bands (2) grey, not white. Peninsular and Ceylonese birds similar in coloration except for individual variation. Steady diminution in size from north to south, some Kerala birds approaching the smallest race *spilogaster* of Ceylon.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	421-461	42-46	94-101	275-310 mm. (Baker)

Recently collected random specimens of *melanotis* show the size trend N. to S. as follows:

		(from skull)		
Gujarat	1 ♂ 440+	—	—	—
	3 ♀ ♀ 469-481	43-48	99-109	290-315 mm.
M.P. and Orissa	1 ♂ 432	44	102	263 mm.
	3 ♀ ♀ 440-467	40-46	100-110	273-310 mm.
Mysore	2 ♀ ♀ 424-497 ¹	43-46	—	260-294 mm.
Kerala	7 ♂ ♂ 357-440	43-46	91-107	211-279 mm.

COLOURS OF BARE PARTS. As in the nominate race.

198. Ceylon Crested Serpent Eagle. *Spilornis cheela spilogaster* (Blyth)

Haematornis spilogaster Blyth, 1853, Journ. Asiat. Soc. Bengal, 21: 351 (Ceylon)
Baker, FBI No. 1769, Vol. 5: 100

LOCAL NAMES. *Rajaliya* (Sinhala); *Kūdūmiyaḍḍa* (Tamil).

SIZE. Kite ±; length c. 59-63 cm. (23-25 in.).

FIELD CHARACTERS. Same as for 196; smaller than 197 otherwise similar. Also with individual colour variations. See Museum Diagnosis.

STATUS, DISTRIBUTION and HABITAT. Race peculiar to Ceylon. Common resident throughout the island. In wooded country all zones, to over c. 2100 metres in the hills.

GENERAL HABITS, FOOD, CALLS, etc. Same as in the Indian races. 'In the courting season it indulges in curious acrobatics, stooping and rolling on the wing, with tail raised and wings half closed and "shivering"' (G. M. Henry).

¹ This may be a vagrant (?) of the northern race.

BREEDING. Season, February to May; chiefly March and April. Nest, site, and egg as in the Indian races. Average size of 22 eggs 68.2×49.4 mm. (Baker).

MUSEUM DIAGNOSIS. Upperparts often with a distinct purple-grey gloss; throat very grey; breast browner, unbarred. But no consistent difference in coloration apart from individual variation; thus best distinguished from *melanotis* of peninsular India (197) only by smaller size.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	355-402	38-45	—	— (Baker)
		(from skull)		
4 ad. ♂ ♂	370-389	41-44	—	222-240 mm.
4 ad. ♀ ♀	384-398	41-44	83(1)	240-254 mm.
COLOURS OF BARE PARTS. As in Indian birds.				(Whistler)

199. Burmese Crested Serpent Eagle. *Spilornis cheela burmanicus* Swann

Spilornis cheela burmanicus Swann, 1920, Syn. List Accipitr.: 81

(Thayemyo, Burma)

Baker, FBI No. 1767, Vol. 5: 99

Plate 12, fig. 6, facing p. 224

LOCAL NAMES. *Sin* (Assam).

SIZE. Kite+; length c. 68 cm. (27 in.).

FIELD CHARACTERS. Same as for the nominate race (196). Rather smaller and paler but doubtfully separable in the field. See Museum Diagnosis.

STATUS, DISTRIBUTION and HABITAT. Resident, possibly with some local movement, in Assam south of the Brahmaputra river; Manipur (?), E. Pakistan (?). Andaman Islands.

Extralimital. Burma, Shan States, Thailand and Tonkin, south to Tenasserim.

GENERAL HABITS, FOOD, etc. Same as in 196 and the other races.

BREEDING. Not recorded within Indian limits.

MUSEUM DIAGNOSIS. Smaller and paler than nominate *cheela* (196). White spots on lower plumage larger and more conspicuous; the black adjoining spots paler and less conspicuous. Terminal black band on primaries narrower.

MEASUREMENTS. Wing 408-463 mm. (Baker). Baker points out that very few have a wing of over 450 mm., and those from the western area only. He pertinently suggests that the bigger birds may be wandering specimens of *S. c. cheela*.

COLOURS OF BARE PARTS. As in 196.

200. Andaman Crested Serpent Eagle. *Spilornis cheela elgini* (Blyth)

Haematornis elgini 'Tytlér' = Blyth, 1863, Jour. Asiat. Soc. Bengal, 32: 87

(South Andaman Island)

Spilornis Davisoni Hume, 1873, Stray Feathers, 1: 307

(Neighbourhood of Port Blair, South Andamans)

Baker, FBI No. 1770 & 1773, Vol. 5: 101, 103

LOCAL NAMES. Unrecorded.

SIZE. Kite —; length *c.* 56 cm. (22 in.).

FIELD CHARACTERS. Like 196 but much smaller and very dark chocolate-brown, both above and below. Underparts largely ocellated with white but without any adjoining black spots. Crest shorter, more brown less black. Tail with two narrow pale bars and narrow pale tip.

Young (immature). Head white, with dark centres to feathers of crown. Face and throat streaked darker. Breast finely barred with dusky and dark brown. Wings more profusely spotted with white than in adult.

STATUS, DISTRIBUTION and HABITAT. Common resident. Andaman Islands. Nicobars (?).

GENERAL HABITS. Presumably the same as in better known races, but very little recorded. Frequents clearings in the forest, hillsides with scattered trees, etc.; less often mangrove swamps than *burmanicus*. Lives partly on crabs (Butler).

BREEDING. Unknown.

MUSEUM DIAGNOSIS. Pale wing-bar next to tips of primaries much narrower than dark bands on either side of it (*contra* in nominate *cheela*).

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	344-407	36-41	81-84 (once 75)	215-241 mm. (Baker)

(composite of *davisoni* and *elgini*, now considered synonymous)

Weight (*elgini*) ♂ 1.75-2.25 lb. (790-1024 gm.); ♀ 2.25-2.75 lb. (*c.* 1024-1450 gm.) — (Hume).

COLOURS OF BARE PARTS. Iris bright yellow. Bill pale horny, bluish horny or fleshy, darker on culmen; cere, lores and orbital region lemon-yellow or bright yellow. Legs and feet yellow.

201. Nicobar Crested Serpent Eagle. *Spilornis cheela minimus* Hume

Spilornis minimus Hume, 1873, Stray Feathers, 1: 464 (Camorta, Nicobar Islands)
Baker, FBI No. 1771, Vol. 5: 192

LOCAL NAMES. Unrecorded.

SIZE. Kite —; length *c.* 48 cm. (19 in.).

FIELD CHARACTERS. Like 196 but very small, pale brown or greyish brown. See Museum Diagnosis.

STATUS, DISTRIBUTION and HABITAT. Apparently endemic in the Camorta-Nancowry-Teressa-Katchall group of the Nicobar islands.

GENERAL HABITS. Davison in *c.* 1873 recorded it as wild and shy and found only in forest near rivers, not frequenting the shores or clearings. No further information has been added since.

FOOD. Stomachs of three specimens collected by Richmond (1903) contained remains of lizards, portions of a chicken, and a crab.

CALLS, etc. Unrecorded.

BREEDING. Unknown.

MUSEUM DIAGNOSIS. Upperparts pale grey or pale brown. Breast greyish brown, unbarred in adults. Chin and throat same colour as breast. Apical black band on primaries short; under 50 mm. in breadth.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	286-290	35-37	c. 75-77	191-192 mm. (Baker)

Wing ♂♂ 256.5-284.5; ♀♀ 288-292 mm. (Richmond).

COLOURS OF BARE PARTS. Iris yellow. Bill light blue, dark horny at tip; cere, gape, and orbital skin bright yellow. Legs and feet yellow (Baker).

202. Great Nicobar Crested Serpent Eagle, *Spilornis cheela klossi*
Richmond

Spilornis klossi Richmond, 1902, Proc. U.S. Nat. Mus., 25: 304

(Pulo Kunyi, Great Nicobar Island)

Baker, FBI No. 1772, Vol. 5: 102

LOCAL NAMES. Unrecorded.

SIZE. Kite —; length c. 46 cm. (18 in.).

FIELD CHARACTERS. The most diminutive race of *cheela*, but close relationship with it superficially unmistakable. See Museum Diagnosis.

STATUS, DISTRIBUTION and HABITAT. Apparently endemic on Great Nicobar Island or Sambelong, the largest and southernmost of the Nicobar group.

GENERAL HABITS, FOOD, etc. Unrecorded, except that among the stomach contents of a specimen were found remains of lizards, rats, a small bird, and an Emerald Dove (*Chalcophaps*).

BREEDING. Unknown.

MUSEUM DIAGNOSIS. 'General colour above . . . drab with light coppery sheen and some of the feathers with narrow white tips; nape and sides of the neck Isabella in colour; top of head black, the longer feathers with narrow tips of Isabella colour; ear coverts, cheeks, and malar region clear smoke grey; breast buffy wood brown, paler on abdomen, sides, thighs, and under tail-coverts; lesser and middle wing-coverts dark drab, prominently edged with white; primaries black with two dusky bars, one only on the outer primary; tail with two pale bars.

'Immature birds have buffy tips to the feathers of head, back and wing-coverts; the tail has three bars instead of two.' (Richmond)

MEASUREMENTS. 'Wing 257; tail 165; tarsus 75; culmen 33 mm.' (Richmond).

COLOURS OF BARE PARTS. 'Iris yellow. Bill, base yellow, middle bluish, tip, black; cere and naked skin on sides of head yellow' (Richmond, 1903).

Genus PANDION Savigny

Pandion Savigny, 1809, Descr. Egypte, Ois., 1: 69, 96. Type, by monotypy, *Pandion fluvialis* Savigny = *Falco haliastur* Linnaeus

Bill moderate; tip long and greatly hooked; festoon variable. Nostrils small, narrow, oblique. Tarsus short, stout, reticulated throughout except on the extremity of the toes. Toes very powerful with prickly scales on the soles; outer toes reversible. Claws rounded beneath, long, subequal, strongly curved. Wings very long and pointed; 3rd primary (as.) longest; 1st between 4th and 5th or equal to latter. Tail almost square.

On morphological characters retained by some authorities in a separate family Pandionidae. (See Witherby 1939, 3: 106-7.)

203. Osprey. *Pandion haliaetus haliaetus* (Linnaeus)

Falco Haliaetus Linnaeus, 1758, Syst. Nat., ed. 10, 1: 91

(Europe, restricted type locality, Sweden ex Fn. Suec.)

Baker, FBI No. 1704, Vol. 5: 3

Plate 12, fig. 1, facing p. 224

LOCAL NAMES. *Mächhlimār*, *Mächhāriya*, *Mächhmānga* (Hindi); *Mächhārang* (Nepal); *Machhmarol*, *Kurari*, *Utkrosh* (Bengal); *Koramēn gaddā* (Telugu); *Hegguli* (Yerukali); *Vrāl āddipān* (Tamil); *Talipparundu* (Malayalam); *Pantiong* (Lepcha).

SIZE. Kite —; length c. 56 cm. (22 in.).

FIELD CHARACTERS. A water-frequenting fish-eating hawk. *Above*, dark brown with some white streaking on the slightly tufted head. *Below*, pure white with a conspicuous broad brown-streaked band, or 'necklace', across upper breast. A blackish band running backwards from behind eye. Sexes alike; female larger.

In overhead aspect glistening white throat and belly separated by the brownish breast-band, closely barred pointed wings with black patches on 'wrist' region (near base of first 2 or 3 primaries), and barred squarish tail, diagnostic. Wings held in line with body, often slightly bent backwards and downwards from 'wrist'.

Young (immature). Feathers of upperparts and wing-coverts scalloped with whitish. Brown breast-band less defined; head, neck, and face more heavily marked with dark brown.

STATUS, DISTRIBUTION and HABITAT. Breeds in small numbers, provenly or circumstantially, along the Himalayas between c. 2000 and 3300 m. altitude (Ladakh, Kashmir, Garhwal, Kumaon) and in Assam (Cachar). Mainly winter visitor, September through March, throughout the sub-continent — from Baluchistan east to Assam and Manipur, south to Kanyakumari. Andaman and Laccadive Islands, Nepal (Valley and lowlands); Ceylon (to c. 1800 m. — Nuwara Eliya lake); Maldive Islands (vagrant?). Not numerous but singly or pairs widely scattered; at large bodies of water — coastal lagoons, estuaries, broad rivers, jheels, and up to the highest multipurpose dammed reservoirs.

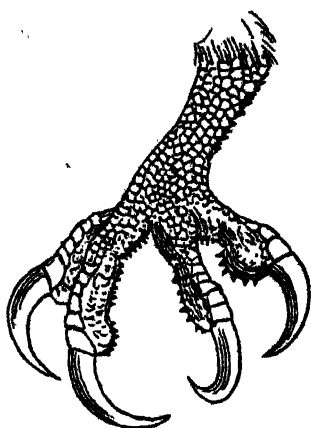
Extralimital. Breeds in Europe and Asia from Scotland (formerly) and Lapland east to Kamchatka and Japan, south to Spain, N. Africa, Mediterranean islands, Greece, Red Sea coasts, S. Arabia and S. China. In winter S. Africa, India, Burma, Thailand, Malay Peninsula, Philippines, Sunda Islands.

GENERAL HABITS. Single birds normally seen perched on fishing stakes, dead trees standing in or near water, islanded rocks, etc. From here it launches sorties to reconnoitre the waterspread, flying in wide circles or back and forth c. 20 or 30 m. up with slow deliberate wing-beats punctuated with bouts of gliding. Now and again the bird stops dead in mid-air hovering like a kestrel, legs dangling and a little forward in readiness, to investigate suspected movement in the water below. At a favourable opportunity hurls itself headlong on a fish with closed wings, going completely under with a



PLATE 18

1 *Falco s. centralasiae*, Hobby (213). 2 *Microhierax melanoleucos*, Whitelegged Falconet (205). 3 *Falco t. amurensis*, Redlegged Falcon (220). 4 *Falco c. chicquera*, Redheaded Merlin (219). 5 *Falco b. jugger*, Lagger Falcon (208). 6 *Falco c. insignis*, Merlin (217). 7 *Falco n. pekinensis*, Lesser Kestrel (221).



× c. $\frac{1}{2}$

great splash. Presently it emerges with the slippery prey gripped firmly in its talons, the prickly soles assisting in the process. With a convulsive shrug to shake off the water from its plumage, the bird makes for a favourite perch where the prey is torn to pieces and devoured. Occasionally a very large fish is struck which the bird has considerable difficulty in overpowering, bobbing up and down with it in the water as the quarry struggles to dive and escape. If too heavy to lift clear, the victim is dragged along the surface and beached on a shelving bank. Instances are known where an osprey, unable to extricate its claws from a particularly large and lively fish, has been pulled under and drowned. In flight occasionally descends to the water, ploughing the surface with dropped talons for

5 or 6 metres at a stretch as if to wash off the slimy remains of a meal. Seldom, if ever, soars and circles aloft for fun as so many other raptors do.

FOOD. Exclusively fish. Often strikes mahseer (*Barbus*) and others heavier than itself.

VOICE AND CALLS. Seldom heard in its winter quarters. Described elsewhere as a clear *kai, kai, kai*; also as a 'a short cheeping whistle'.

BREEDING. Reports of Indian breeding not completely satisfactory, though evidently a few pairs do so in the Himalayas, e.g. in Kashmir and Ladakh. Baker found a pair breeding in several successive years in Cachar in March and April. Here the *nest* was a huge structure of sticks and branches c. 138 cm. across and nearly as deep. Built c. 12-14 m. up in a thinly foliated tree standing on high ground in the middle of a *bheel* or swamp. According to Baker average size of 100 European eggs 61.6 × 46.3 mm. with which three taken by him in Cachar agree. Normal clutch, 2 or 3, rarely 4, eggs white or yellowish white, spotted and blotched with dull red; very handsome. (For an excellent breeding biology see Horst Siewert 1941, 'Zur Brutbiologie des Fischadlers *Pandion h. haliaetus* (L.)', *Jour. f. Orn. Ergänzungsband* 3: 145-93.)

MUSEUM DIAGNOSIS. As for the genus. For details of plumage etc. see Witherby 1939, 3: 110-11.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	452-495	37-39	c. 59-65	191-223 mm.
♀♀	468-508	—	—	204-220 mm.
				(Baker)
Adults recently collected in India measure:				
		(from skull)		
2♂♂	481-481	41-41.5	—	201-210 mm.
3♀♀	482-537	41-43	60-61	200-251 mm.
		(2 msd.)	(2 msd.)	(2 msd.)
			(SA, Whistler, Meinertzhagen)	

COLOURS OF BARE PARTS. Iris yellow or golden yellow; eyelids greenish blue. Bill black; cere and gape dull greenish blue. Legs and feet pale greenish or yellowish; claws black.

Family FALCONIDAE, Falcons

For anatomical details see Stresemann 1927-34, Aves: 816; Witherby 1939, 3: 1-2

Key to the Genera

	Page
Wing under 170 mm..... <i>Microhierax</i>	338
Wing over 180 mm..... <i>Falco</i>	341

Genus MICROHIERAX Sharpe

Microhierax Sharpe, 1874, Cat. Bds. Brit. Mus., 1: 350 (in key), 366. Type, by original designation, *Falco fringillarius* Drapiez

Bill large, slightly compressed, with a very large tooth on upper mandible, sometimes with a second and smaller anterior tooth. Wings long in proportion to size of bird but rather rounded. 2nd and 3rd primaries (as.) longest; 1st and 4th subequal and nearly as long. Tail long and nearly square. Tarsi and toes powerful, with strong claws; lateral toes nearly equal in length and not much shorter than middle toe. Tarsus feathered about half way down.

Key to the Species

White collar present.....	<i>M. caerulescens</i>
White collar absent.....	<i>M. melanoleucos</i>

204. Himalayan Redbreasted Falconet. *Microhierax caerulescens* *caerulescens* (Linnaeus)

Falco caerulescens Linnaeus, 1758, Syst. Nat., ed. 10, 1: 88

(Asia = Bengal, ex Edwards, pl. 108)

Baker, FBI No. 1734, Vol. 5: 52

Plate 12, fig. 4, facing p. 224 and Plate 17, fig. 7, facing p. 320

LOCAL NAMES. *Ching fin nyel* (Lepcha); *Daoling kashiba* (Cachari).

SIZE. Bulbul \pm ; length c. 18 cm. (7 in.).

FIELD CHARACTERS. A diminutive black-and-white falcon, very shrike-like in silhouette when perched. Pointed wings and flight — a series of rapid flaps followed by a graceful guide — reminiscent of Ashy Swallow-Shrike (*Artamus fuscus*). Tail, partly spread in flight, square-ended and rather triangular, with apex at base — rather like a barbet's but proportionately longer.

Adult. *Above*, glossy black. Forehead, supercilium, and sides of face white. A prominent black band through the eye; a broad white collar on hindneck. *Below*, chin, throat, thighs



x c. 1

and under tail-coverts deep ferruginous. Rest of lower plumage rusty white. Sexes alike; female larger.

Young (immature). Forehead, supercilium, face, and collar more or less ferruginous or chestnut. Underparts generally whiter. In quite young birds upperparts and wing-coverts scalloped with pale rufous.

STATUS, DISTRIBUTION and HABITAT. Resident. The Himalayan foothills (normally to c. 650 m. elevation; recorded as high as c. 2000 m.) and terai from Kumaon in Uttar Pradesh east through Nepal, Sikkim, Bhutan, and Assam south to Cachar. Westernmost record in U.P., Naini Tal (c. 79° 26'E.); southernmost Sultanpur (c. 26°15'N.). Affects outskirts of forest, deciduous and evergreen, and abandoned cultivation clearings with tall dead trees to serve as foraging bases. The race *burmanicus* replaces it extraliminally, in Burma, the Shan States, Thailand, etc.

GENERAL HABITS. Met with singly, in pairs, or loose (family?) parties of four or five, perched individually on a derelict spar standing in the middle of a forest clearing, or huddled on a snag near the top of a tall tree whence a good lookout can be kept over the surroundings, launching out after prey one by one or several together and circling back to the same huddle. On the pole-top the bird slowly rotates to face all directions in turn, its fierce eye alert and watchful, head bobbing ludicrously now and again like the spotted owl (*Athene*), and tail swinging slowly and deliberately up and down as in the blackwinged kite (*Elanus*). From time to time it darts out at lightning speed on rapidly beating wings at some butterfly or dragonfly — sometimes swooping quite low down — snatching the insect in its talons in mid-air and circling back to the same perch with a steep upward glide at the end — very like a shrike (*Lanius*). Sometimes descends to the ground in search of grasshoppers, etc. as drongos occasionally do. The abruptness with which such a fast-moving bird will become completely immobile immediately upon regaining its perch is quite astonishing. Here the victim is held under foot, the wings pulled off and floated to the ground, the body torn up with a distinct semblance of anger and ferocity — as if dealing punishment — before being devoured. The ground under favourite hunting bases is littered around with butterfly and dragonfly wings, providing a good index of the species taken. A butterfly chase by this pigmy falcon is strongly reminiscent of the twirls and turns of a merlin when in pursuit of a meadow pipit (Meinertzhagen).

Rather sluggish during the middle of the day but intensely active towards evening, dashing about after prey 'uttering all the while a shrill whistle'. Towards April the birds congregate in small colonies among clusters of lofty simul trees (*Salmalia*) in open tracts in preference to forest, but disperse widely after breeding (H. Stevens, 1923-5).

FOOD. Large insects, chiefly butterflies, dragonflies, grasshoppers, beetles. Occasionally small birds, wren warbler (*Prinia*), rubythroat (*Erithacus pectoralis*), and pipit (*Anthus rufulus*) being recorded. 'Ypthima butterflies are captured on the wing, but larger species like *Papilio* and *Danaus* avoided' (Meinertzhagen), though a *Papilio memnon* was taken while sipping nectar from flower (G. E. Shaw). Butterflies form a regular and important item of its dietary. Observers have suggested that the birds can discriminate to some extent between unsavoury species and their palatable mimics, thus

e.g. between Danaine or Euploecine models, and their *Papilio* mimics, avoiding the former and capturing the latter!

BREEDING. Curiously enough for such a comparatively common bird, unrecorded. Apparently the Burmese race (*M. c. burmanicus*) has also been found nesting only once or twice. *Nest*, a disused barbet (?) hole in a dead branch. *Eggs*, 4, dirty white (once 14 April).

MUSEUM DIAGNOSIS. As for the genus. For details of plumage see Baker, loc. cit.

MEASUREMENTS

	Wing	Bill (from feathers(?))	Tarsus	Tail
♂♂	91-106	11-12	c. 20-22	58-64 mm.
♀♀	100-112	12-13	—	64-67 mm. (Baker)

Recent specimens from Nepal and Sikkim measure:

		(from cere)		
5 ♂♂	101-104	10-11 (4 msd.)	—	60-65 mm. (4 msd.)
3 ♀♀	109-110	11 (2)	25 (1)	63-65 mm. (2 msd.)

(SA, Biswas, Ripley)

COLOURS OF BARE PARTS. Iris brown. Bill, basally yellowish green; distally black. Legs and feet blackish slate.

MISCELLANEOUS. This fierce and bold little falconet (or the next (205), or perhaps both) was trained in the Mogul Emperor Akbar's days, and also later, to strike sparrows and other small birds — some considerably larger and heavier than itself.

205. Whitelegged Falconet or Pied Pigmy Falcon. *Microhierax melanoleucos* (Blyth)

Ierax melanoleucos Blyth, 1843, Jour. Asiat. Soc. Bengal, 12; 179 (Assam)

Baker, FBI No. 1736, Vol. 5: 54

Plate 18, fig. 2, facing p. 336

LOCAL NAME. *Daoling kashiba* (Cachari).

SIZE. Bulbul \pm ; length c. 20 cm. (8 in.).

FIELD CHARACTERS. A d u l t. A diminutive shrike-like falcon, similar to Redbreasted Falconet (204) but *above*, black without the white hind collar; *below*, pure white with no rusty tinge. Sexes alike.

Young (immature). Undescribed.

STATUS, DISTRIBUTION and HABITAT. Resident in Assam from Kamrup dist. eastward through Dibrugarh dist., south to Cachar; Manipur; E. Pakistan (Sylhet dist., Hill Tippera, Chittagong dist.). Plains, foothills and up to c. 1500 m. elevation. Affects the neighbourhood of forest clearings and tea plantations, and wooded foothills country in both deciduous and ever-green biotopes.

Extralimital. Yunnan (?), Tonkin and SE. China.

GENERAL HABITS. Similar to the Redbreasted Falconet (204). Usually bold and unafraid of man, e.g. in the neighbourhood of tea plantation labourers' barracks. Takes insects on the wing by lightning sortics from

an elevated stance, flying out with rapid wing-beats, circling and sailing back to the perch after the capture — actions very reminiscent of the Swallow-Shrike. Insects are disposed of in the air or, if large, brought back to the base for dismemberment before devouring. Capable of great speed, sometimes stooping on birds much larger than itself just like the true falcons, killing them by striking with the hind claw. Begins feeding by digging with its bill into the head of the victim with the same semblance of ferocity and vindictiveness as 204.

FOOD. Butterflies, dragonflies, grasshoppers and other large insects. Possibly also mice and lizards. Among its bird victims are recorded scimitar babbler, thrush, sparrow, and swallow.

VOICE AND CALLS. A shrill scream; also a low chattering call. A prolonged hiss when angry (Baker).

BREEDING. Little known. *Season*, March to May. *Nest*, a disused woodpecker or barbet hole; in one case on the underside of a branch c. 13 m. up in a tree standing in a forest clearing, with a quantity of beetle elytra and other insect remains as (fortuitous?) lining. *Eggs*, presumably 3 or 4 (judging from flying broods) but so far more than one (incomplete clutch) never taken from nest; pure white, unmarked, with a soapy surface. Average size of 6 eggs 27.9×22.4 mm. (Baker). Presumably both sexes incubate, but this needs confirming. Incubation period unknown.

MUSEUM DIAGNOSIS. No white collar; lower plumage including thigh-coverts pure white.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♀ ♀	111-117	14-15	22	71-73 mm. (Baker)

Two specimens in the Bombay Natural History Society's collection measure:
(from skull)

♂	116	14	25	65 mm.
♀ ?	118	14	27	71 mm. (SA)

Kirke-Swann (p. 323) gives Wing ♂ 108; ♀ 121 mm.

COLOURS OF BARE PARTS. Iris bright brown. Bill deep slaty blue to blackish; tip black. Legs and feet dark horny brown to black.

Genus *FALCO* Linnaeus

Falco Linnaeus, 1758, Syst. Nat., ed. 10, 1: 88. Type, by subsequent designation,

Falco subbuteo Linnaeus. (A.O.U. Committee, 1886)

Bill stout and strongly toothed inside the hooked tip, often with a blunt festoon behind the tooth. Nostril circular, with a central tubercle. Tarsus equal to or shorter than middle toe without claw. Upper part of tarsus plumed in front; naked portions covered with small hexagonal scales. Toes very long, covered with transverse scales above; hind toe shorter in proportion and very powerful; claws sharp, curved and strong. Tail moderately long, slightly rounded but not graduated. Wing long and very pointed, the proportions of the primaries varying somewhat. (See Museum Diagnosis under the different species.)

Genus nearly cosmopolitan, ten species with their races occurring within our limits as residents or winter visitors. Falcons (*Falco*) easily distinguishable from hawks (*Accipiter*) even at great heights in the sky by their long, pointed, swallow-like wings and shorter tails. When soaring the wings are held straight, on same plane as body, but when flapping they are usually bent as though preparing for a stoop. There is considerable change in all falcons from immature to adult plumage, and identification from descriptions in the transitional stages difficult and unsatisfactory. Immature usually distinguishable by bluish tinge of feet *v.* bright yellow in adults, *Falco p. peregrinator* being an exception.

Key to the Species

	Page
A Size large, middle toe without claw over 40 mm.....	1
B Size small, middle toe without claw under 40 mm.....	2
1 First primary longer than third; upperparts ashy grey or slate grey in adults.....	<i>F. peregrinus</i> 347
First primary about equal to third; upperparts not ashy or slaty grey.....	<i>F. biarmicus</i> 342
2 Second and third primaries subequal; first and fourth primaries subequal.....	a
Second primary longest, first much longer than fourth.....	b
a Crown grey or brown.....	<i>F. columbarius</i> 357, 358
Crown chestnut.....	<i>F. chiequera</i> 359
Crown streaked.....	<i>F. tinnunculus</i> 365-8
b Middle toe over 29 mm.....	I
Middle toe under 29 mm.....	II
I Breast white or buff with brown streaks.....	<i>F. subbuteo</i> 352
Breast deep rufous unspotted in adults.....	<i>F. severus</i> 355, 356
Breast sooty grey.....	<i>F. concolor</i> 356
II Claws black.....	<i>F. vespertinus</i> 361
Claws yellow.....	<i>F. naumanni</i> 363

FALCO BIARMIGUS Temminck

Key to the Subspecies

	Page
A A distinct narrow check-stripe; middle tail-feathers entirely brown in adults.....	<i>F. b. jugger</i> 344
B No check-stripe; middle tail-feathers with white spots on each web....	1
1 Plumage above with no bars.....	<i>F. b. cherrug</i> 342
Plumage above barred throughout.....	<i>F. b. milvipes</i> 344

206. Saker or Cherrug Falcon. *Falco biarmicus cherrug* J. E. Gray

Falco cherrug J. E. Gray, 1834, Ill. Ind. Zool., 2: pl. 25 (India)

Baker, FBI No. 1722; Vol. 5: 39

LOCAL NAMES. *Chārg* ♀, *Chārgela* ♂ (Hindi). The name 'Saker' is evidently the same as *sāqr* (= falcon, Arabic).

SIZE. Kite —; length *c.* 50-56 cm. (20-22 in.).

FIELD CHARACTERS. Male (adult). *Above*, head pale rufous-white with narrow blackish shaft-stripes. Sides of face and throat white with dusky

streaks on ear-coverts, but no distinct moustache. Upperparts earthy brown, scalloped with rufous. *Below*, breast and belly whitish, thickly marked with longitudinal brown drops, becoming bars on flanks.

Female similar but larger and more heavily marked below.

Young (immature). *Above*, darker and more brown generally. Head more brown with the darker markings more extensive. *Below*, chin and throat unmarked white; rest of underparts boldly streaked with dark brown.

STATUS, DISTRIBUTION and HABITAT. Rather scarce winter visitor; arriving c. October, gone again by April. W. Pakistan (NWF. Province, Sind, Punjab) and adjoining NW. India in E. Punjab and Rajasthan — how far east uncertain but has been obtained in Delhi. Hodgson's specimens from Nepal referred to by Baker (loc. cit.) belong to the next race, *milvipes* (Biswas). Affects desert and open semi-desert biotope.

Extralimal. Breeds in Hungary, middle and southern Russia, and the Caucasus. In winter to Egypt and NW. India (Peters).

MIGRATION. No ringing records.

GENERAL HABITS. Keeps to open country like the Laggar. Much prized for falconry and trained to strike gazelle, kite, owl, houbara bustard, hare, etc., being considered second only to Goshawk or Peregrine for the sport. In the wild state its method of hunting small animals is to fly low over the ground and crash into its victim, 'binding' and crushing it to death. However, when trained to larger quarry like kite and houbara it adopts a different and more spectacular technique. It manoeuvres itself into a position higher than its quarry and then stoops on it with terrific velocity raking it with its powerful hind claw in passing, or 'binding' in mid-air, both birds interlocked and tumbling down together in spirals with extended wings. Excellent sport is said to be provided as pursuer and pursued both try to gain a position of advantage above each other, rising in spirals (or 'ringing' according to the term used in falconry) higher and higher till almost lost to sight.

FOOD. Largely spiny-tailed lizards (*Uromastix hardwickii*), desert gerbilles (*Meriones hurrianæ*) and other small mammals, and birds like sandgrouse (*Pterocles*). A frog has been recorded, but this probably rather exceptional in its desert habitat.

VOICE and CALLS. Unrecorded.

BREEDING. *Extralimal.* Season, April to May. Nest of sticks in trees or on cliffs, bulky and well lined; occasionally usurped from a vulture or other bird. Eggs, 3 or 4, intermediate between those of the Peregrine and the Laggar in coloration and markings.

MUSEUM DIAGNOSIS. First primary (as.) about equal to 3rd. Upperparts not ashy- or slaty grey but brown with broad tawny edges (scalloping) and blackish shafts. No moustachial- or cheek-stripe; middle tail-feathers with white spots on each web. Differs from the race *F. b. milvipes* (207) in having upper plumage unbarred.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♂	348-370	c. 26-27	c. 56-58	{ 190-200 mm. 207-210 mm. (Baker)
♀ ♀	390-412			

COLOURS OF BARE PARTS. Iris dark brown usually without any suggestion of yellow. Bill ivory white or yellowish white, tipped blackish; cere dull yellow. Legs and feet dull yellow or yellowish green; claws black.

207. Shanghar Falcon. *Falco biarmicus milvipes* Jerdon

Falco milvipes Jerdon, 1871, Ibis: 240 (Umballa, India)

Baker, FBI No. 1723, Vol. 5: 41

LOCAL NAMES. Apparently same as for 206.

SIZE. Kite — ; length *c.* 50–58 cm. (20–23 in.).

FIELD CHARACTERS. Adult. *Above*, darker brown than in Cherrug (206) and barred all over with pale rufous, reminiscent of female kestrel. Crown darker rufous than in 206; sides of head more streaked with blackish; a distinct broad blackish moustachial stripe. *Below*, breast and belly whitish, marked similarly with longitudinal but more blackish drops, becoming bars on flanks. Sexes alike; female larger.

Young (immature). Difficult to distinguish from young of 206, but darker and generally with tail more completely cross-barred. Field identification unsatisfactory.

STATUS, DISTRIBUTION and HABITAT. Rare winter visitor. W. Pakistan (Baluchistan, W. Punjab) and adjoining open semi-desert country in NW. India, but imperfectly known. Hodgson's specimens from Nepal, hitherto considered *F. b. cherrug*, belong to this subspecies (Biswas).

Extralimital. Breeds from Pamirs and the Altai Mountains across SE. Mongolia and south to the Nanshan and Alashan Mountains (Peters).

GENERAL HABITS, FOOD, etc. Little known, but apparently not different from those of the Cherrug.

MUSEUM DIAGNOSIS. First primary (as.) about equal to 3rd. Cheek-stripe more distinct than in Cherrug. Upper plumage barred with pale rufous throughout.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♂	340–351	25–27	50–60	188–236 mm.
♀ ♀	374–435			
				(Baker)

COLOURS OF BARE PARTS. As in 206 but bill darker, more bluish slate than ivory white.

208. Laggar Falcon. *Falco biarmicus jugger* J. E. Gray

Falco jugger J. E. Gray, 1834, Ill. Ind. Zool., 2: pl. 26 (India)

Baker, FBI No. 1721, Vol. 5: 37

Plate 18, fig. 5, facing p. 336

LOCAL NAMES. *Lāggār* ♀, *Jāggār* ♂ (Hindi); *Lāgḍdu* (Telugu).

SIZE. Kite — ; *c.* 43–46 cm. (17–18 in.).

FIELD CHARACTERS. Adult. Upperparts dark and ashy brown. Crown and nape whitish. A narrow but distinct moustachial stripe running down



× c. ½

from in front and below eyes. *Below*, white or whitish with longitudinal light brown drops (sometimes obsolescent on breast and abdomen), larger and more numerous on flanks and thighs. Sexes alike; female larger.

At short range distinguished from Cherrug Falcon by middle tail-feathers being entirely brown, *v.* with much white in them.

In overhead flight the white breast, and dark-and-white markings on the lining of the pointed wings, also that two birds are usually seen together, suggest its identity.

Young (immature). *Above*, dark brown, the feathers scalloped paler. *Below*, only chin and throat whitish; rest of underparts dark brown.

STATUS, DISTRIBUTION and HABITAT. Resident (partial local migrant in some areas) practically throughout the subcontinent from W. Pakistan (Baluchistan, Sind, NWFP, Punjab) east through Assam and Manipur, and from c. 1000 metres up in the Himalayas southward to Kanyakumari, including Nepal and E. Pakistan. Rare in S. India; absent in Ceylon. Affects dry open country, thin jungle, and cultivation; avoids humid forest tracts.

Extralimital. Breeding also in Afghanistan north to Turkestan, near Tashkent, and in S. Turkmenia (Dementiev & Rustamov).

GENERAL HABITS. The commonest and most easily identified of all our falcons. Normally seen in separated pairs — each pair with a vast territory — perched on poles or tree-tops in open dry scrub country and the neighbourhood of cultivation and habitations; in the last invariably chivvied by house crows (*C. splendens*). A pair will sometimes take up its abode even in the midst of a noisy town, using a high tower or temple spire as foraging base for sorties against the urban pigeon population which provide the birds with comfortable living. Pairs usually hunt in coordination taking turns to chase and harry the prey, both birds then sharing the spoils. The laggar is well known for its habit of waiting on sportsmen as they walk the crops or beat the bushes for partridge or quail, and stooping and carrying off a bird that flushes or one that has been pricked by shot.

Not specially prized by falconers but is, or was, trained to fly at crows, partridges, cattle egrets, and birds much larger than itself such as grey heron, florican and houbara bustard — also at hare. When flown at large birds it adopts same technique as the cherrug (*q.v.*), spiralling upwards or 'ringing' into the sky with its quarry, constantly manoeuvring for position above from which it can stoop and bind and drop to earth together with its victim.

On approach of the breeding season pairs commonly indulge in spectacular aerial play, stooping at each other with astonishing velocity, side-slipping, half somersaulting, and effortlessly zooming aloft again. Sometimes hovers against wind like kestrel (*Roseveare*).

FOOD. Field rats, bats, lizards, small birds, e.g. mynas, babblers, drongos, quails and partridges. Also grasshoppers and locusts. An occasional pair

sometimes attaches itself to a poultry run, the birds then becoming a serious menace to small chickens.

VOICE and CALLS. A shrill prolonged cry *whi-se-se*, seldom heard except in the breeding season.

BREEDING. *Season*, overall January to April. *Nest*, a deep platform of twigs, lined with straw, leaves, etc. 10 to 15 metres up in a large peepul, banyan or mango tree; lower down in acacias in Rajasthan, N. Gujarat and semi-desert areas. Sometimes built on a ledge of cliff, or on a minaret or cornice of a ruined building. Old nests of other birds of prey and crows are frequently appropriated. A curious circumstance commonly observed and recorded is that in the same tree, building, or cliff as holds a laggar's nest may often be found nests of such gentle species — rollers, pigeons, doves and others — as normally comprise its prey. The co-tenants are here left unmolested, and on their part seem completely unperturbed by the comings and goings of the falcons. *Eggs*, 3 or 4, rarely 2 or 5, handsome, rather variable in coloration: pale stone or pinkish cream, densely blotched and smudged with brick-red or reddish brown. Average size of 60 eggs 50.0×39.4 mm. (Baker). Both sexes assist in building or repairing the nest, the male bringing the material the female arranging it in position. Both sexes incubate and feed the young. Period of incubation unknown. The birds are remarkably close sitters and demonstrate fiercely against a human nest-robber, diving at him repeatedly yet seldom striking.

MUSEUM DIAGNOSIS. First primary (as.) about equal to 3rd. A distinct narrow check-stripe, *contra* Cherrug. Middle tail-feathers entirely brown in adults. For details of plumage see Baker, loc. cit.

Chick (in down). 'Fairly long, dull white. Whole body covered except in definite places (apteria). Whole head covered, and down continuous thence down hindneck to spinal track, which spreads out over back of thigh and is continuous with lateral ventral tracks. Between the spinal and humeral tracks, an apterion with sparse short tufts of down. From the chin run two ventral neck tracks, separated by apteria from the dorsal neck track and from each other, which at the top of the sternum divide into lateral and median sternal tracks, the apteria between them having scanty short tufts; apterion in centre of abdomen, rest covered with sparse down continuous with dorsal track laterally. Upper surface of wing except manus, clothed with long down, undersurface four rows of short down. Thumb with distinct claw' (Ticehurst, 1926). For description of down plumage and first plumage see also Whistler, JBNHS 22: 397. For plumage when 7 months old, and of the same bird when nearly adult at 17 months see Inglis, *ibid.* 14: 560. According to Hume acquires adult plumage when fully 3 years old (SF 5: 50).

MEASUREMENTS

	Wing	Bill (from skull)	Tarsus	Tail
♂♂	316-335	25-31	49-53	164-183 mm.
♀♀	357-370	27-33	46-54	186-210 mm.

(SA)

COLOURS OF BARE PARTS. *Adult.* Iris dark brown. Bill bluish slaty, darker at tip, paler and sometimes yellowish at base; cere yellow. Legs and feet yellow; claws black. *Juvenile.* As above, but cere pale greyish green; legs and feet pale grey, greenish grey, or dull slaty.

FALCO PEREGRINUS Tunstall

Key to the Subspecies

		Page
A	Cheek-stripe narrow, a buff nuchal collar <i>F. p. babylonicus</i>	349
B	Cheek-stripe broad, nuchal collar lacking	1
1	Above paler, below white or almost so..... <i>F. p. japonensis</i>	347
	Above much darker, below very ferruginous <i>F. p. peregrinator</i>	350

209. Eastern Peregrine Falcon. *Falco peregrinus japonensis* Gmelin

Falco japonensis Gmelin, 1788, Syst. Nat., 1(1): 257, No. 44, ex 'Japanese Hawk', Latham, J., Gen. Syn. Bds., 1: 33, No. 7b ('flew on board off Japan')

Falco calidus Latham, 1790, Index Orn., 1: 41 (India)

Falco peregrinus ussuriensis Buturlin, 1907, Psov. i. Ruzejn. Okhota, 13: 100 (Ussuriland and Japan)

Falco peregrinus harteerti Buturlin, 1907, Psov. i. Ruzejn. Okhota, 13: 100 (Lower Lena to Anadyr, common on the Kolyma)

Cf. Stresemann, E., 1949, Ibis 87: 253

Baker, FBI No. 1718, Vol. 5: 32

LOCAL NAMES. *Bhyri* ♀, *Bhyri bacha* ♂ (Hindi. Apparently a corruption of the Arabic name 'Bāhārī', implying its connexion with water, cf. the American name 'Duck-hawk'); *Bhyri dega* (Telugu); *Dega* (Yerukali); *Kāyāl pūllū* (Malayalam). Among falconers 'falcon gentle' = ♀ peregrine; 'tiercel' or 'tiercel gentle' = ♂.

SIZE. Kite —; Jungle Crow ±. Length c. 40–48 cm. (16–19 in.).

FIELD CHARACTERS. A typical, compact, pointed-winged, broad-shouldered, streamlined falcon.

Adult. *Above*, head slaty black with conspicuous black cheek- or moustachial stripes. Upperparts grey, barred with blackish. *Below*, pinky fulvous or rufous-white, narrowly barred from lower breast down with blackish. Sexes alike; female larger.

In overhead aspect robust bullet-shaped *whitish* body (*v.* rufous in Shaheen — 211), underside of wings narrowly barred with black, and comparatively short unexpanded tail are suggestive. Prominent black moustachial stripes contrasting with white chin and throat, coupled with swift purposeful pigeon-like flight and short glides, are further pointers to its identity.

Young (immature). *Above*, dark brown, darkest on head. *Below*, rufescent white, all except chin and throat boldly streaked with brown, the streaks becoming bars on flanks and thighs. Transition plumages from juvenile to adult confusing and difficult to identify with certainty.

STATUS, DISTRIBUTION and HABITAT. Winter visitor (September/October to March/April) practically throughout the subcontinent from Baluchistan eastward through Assam and Manipur, and from Gilgit and Kashmir (once at c. 4000 metres in the Indus valley) and along the foot of the Himalayas south to Kanyakumari. Ceylon (Dry Zone — mostly in the juvenile plumage); Nepal (Valley); Andaman (?), Nicobar (?), Laccadive islands; Maldive Islands (apparently 'infrequent in winter' — Phillips.

Subspecies?). Affects the neighbourhood of rivers, jheels, coastal lagoons and marshes — the favourite haunts of migratory waterfowl.

Extralimital. 'Breeds in N. Asia from W. Siberia east to Anadyr and Kamchatka. In winter migrating to Japan, SE. India, Sunda Islands, the Moluccas, New Guinea, and occasionally to N. Africa' (Peters).

MIGRATION. No ringing records.

GENERAL HABITS. More individualistic than the Laggar, seldom hunting in couples. Not actually crepuscular but more active in its hunting just after dawn and towards evening. Spends the daytime ensconced on a shady bough of a tree overlooking its feeding territory, or perched in a sandy river-bed or on a tree-stump or mound. When hunting flies low and fast with rapid powerful wing-beats, the wings usually slightly bent back from the first joint, 'On viewing ducks on a pool or a flock of doves in the fields, the falcon drops to within a few feet of the ground, the beat of the wings becomes even faster than before and the wings bend closer to the body and it fairly hurls itself through the air into the middle of the flock, which will probably rise *en masse* when the falcon is still a few yards distant. Having selected one particular bird the chase begins. . . . Usually the dove succeeds in evading those dread talons in the first instance and neatly doubles back. Up rises the falcon almost vertically to her "pitch", turns and shoots down like an arrow in the wake of its quarry, following every turn and twist of the latter. Another miss and up she goes again determined to secure her breakfast before the dove can reach the shelter of the trees surrounding a village, not far distant. The dove reaches the fringe of trees closely followed by the falcon, and dashes right into the branches of the nearest tree. The falcon once more rises high into the air, circles round once or twice in the hope of its quarry or another bird leaving the security of the trees for the open ground beyond, gives up the chase and flies straight, away, rising steadily as it goes, to make an attack elsewhere' (Donald, JBNHS, 27: 283).

Largely predatory on waterfowl, which are usually struck in mid-air, the falcon stooping almost vertically from above at incredible velocity, wings pressed to its sides and with a loud swishing sound, raking with the hind claw and literally ripping open the victim which falls limply to the ground. The peregrine circles a couple of times before stooping again to retrieve the quarry. It then repairs to its favourite feeding-perch and thoroughly plucks its victim before beginning to tear and devour it. Not infrequently it stoops, strikes, and binds on the quarry in mid-air all in the same lightning action, bearing it away in its stride. A peregrine will often stoop at a duck falling to a sportsman's gun, and so intense is its concentration on the quarry then that it will stoop again and again after an initial miss, regardless of shots fired at it which may even send its feathers flying.

FOOD. Chiefly waterfowl — ducks, coots, moorhens, lapwings, etc. — and waders; also pigeons, partridges, and many other birds. Among its prey have been specifically recorded Kaleej pheasant (*Lophura leucomelana*), Imperial Pigeon, Chough, Caspian Tern, and early-flying bats. The more robust female (*bhyri*) is trained to strike birds much larger and heavier than itself, e.g. egrets, herons, storks, cranes and bustard. Cases reported of single birds (subspecies?) coming on board ships in mid-ocean (once along Arabian

coast) and subsisting on Storm Petrels (*Oceanites oceanicus*), flying out over the sea and returning to ship with the prey (*Sea Swallow*, 1957, 10: 20; *Ardea*, 1961, 49: 176-7).

VOICE and CALLS. None recorded in its winter quarters. Reportedly noisy when breeding.

BREEDING Extralimital. Nest, situation, eggs, etc. as in the Shaheen (211) q.v.

MUSEUM DIAGNOSIS. First primary (as.) longer than 3rd. Upperparts ashy grey in adult. Cheek-stripe broader than eye. No nuchal collar. Crown slaty black; breast very slightly rufous. For details of plumages of nominate race see Witherby 1939, 3: 13-15. *F. p. japonensis* differs from it (doubtfully) in being rather paler, with less black on sides of head and ear-coverts — a narrower moustachial stripe and large white patch behind it.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	297-316	c. 25-26	c. 49-51	134-145 mm.
♀♀	344-379	27-30	—	— mm. (Baker)

Middle toe with claw, ♂♂ c. 57-58; ♀♀ 62-70 mm.

COLOURS OF BARE PARTS. Iris brown or deep hazel. Bill bluish slaty, yellowish at base of lower mandible; cere yellow. Legs and feet dull chrome-yellow to almost orange-yellow; claws deep slaty to almost black.

210. Redcapped or Barbary Falcon. *Falco peregrinus babylonicus* P. L. Sclater

Falco babylonicus P. L. Sclater, 1861, *Ibis*: 218, pl. 7
(Oudh, in India, Babylonia and Abyssinia. Type from Oudh)
Baker, FBI No. 1720, Vol. 5: 36

LOCAL NAMES. *Shāheen*, *Safēd shāheen* (Hindi); *Lālsir shāheen* (of Punjab falconers).

SIZE. Kite —; Jungle Crow ±. Length c. 38-46 cm. (15-18 in.).

FIELD CHARACTERS. Like the Peregrine in shape and build.

Adult. *Above*, crown largely rufous or chestnut and ashy brown. Feathers round eye and narrow cheek-stripe black. Sides of neck buff; a broad rufous nuchal collar. Upperparts and tail ashy grey cross-barred with blackish. *Below*, chin and throat whitish; rest of underparts pale rufous; flanks and under wing-coverts barred blackish. Sexes alike; female larger.

Young (immature). *Above*, dark brown broadly scalloped with rufous. Tail barred rufous and brown. A broad rufous nuchal collar; black cheek-stripes and around eyes as in adult. *Below*, rufous with broad blackish streaks except on chin and throat.

STATUS, DISTRIBUTION and HABITAT. Breeding sparsely in NW. Pakistan south of Kohat, and in Baluchistan. Chiefly winter visitor in Baluchistan, Sind, Punjab, NWFP and in NW. India (to Kashmir, Punjab, U.P., Rajasthan, N. Gujarat). Rare in Madhya Pradesh, taken at Raipur (21° 16'N., 81°42'E.) — D'Abreu. Along foot of hills from Jhelum to Peshawar and on through Kohat to border of Afghanistan at Parachinar, both *F. p.*

babylonicus and *F. p. peregrinator* found during breeding season (Ratray, *Ibis* 1919: 370). Affects barren stony semi-desert tracts with sand mounds, *Capparis* bushes, scattered trees of *Prosopis spicigera* and other xerophytic species — largely the neighbourhood of cultivation in such biotope.

Extralimital. Breeds in W. and C. Asia from Mesopotamia (Iraq) to the Gobi Desert, south to Persia and Baluchistan. Winters in NW. India (Peters). For biology in Turkestan and discussion on distribution, variation, moult, etc. see Dementiev, 1957, *Ibis* 99: 477-82.

GENERAL HABITS. Very similar to those of the Peregrine and Shaheen falcons except for its habitat preference of barren desert country and rocky hills. Inclined to be somewhat crepuscular like the Peregrine, hunting more actively at dawn and fairly late in the evening. Has sometimes been observed stooping playfully at birds on the wing, apparently with no intention to kill.

FOOD. Partridges, sandgrouse, and other birds. Presumably also gerbilles, lizards and large insects as available. Sometimes takes early-flying bats.

VOICE and CALLS. Unrecorded.

BREEDING. On circumstantial evidence breeds in Baluchistan, but no direct confirmation by nest or eggs as yet. Two young recorded as taken from an eyrie in the Gumal Pass (32° 2' N., 70° 10' E.) at c. 650 m. alt., Dera Ismail Khan dist., W. Pakistan (date?), and believed to breed in some numbers in the hills about the Khyber Pass. *Nest* and site as in 211, q.v. *Eggs*, 3 or 4, creamy white blotched and spotted with reddish brown, but showing considerable variation in coloration and markings. Size c. 53 × 43 mm.

MUSEUM DIAGNOSIS. First primary (as.) longer than 3rd. Cheek-stripe narrower than eye; rufous-buff nuchal collar; head ashy grey and rufous. For details of plumage see Baker, loc. cit.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♂	273-284	23-26	45-46	126-135 mm.
♀ ♀	320-338	26-28	53-55	151-158 mm. (Baker)

A ♀ weighed 2 lb. 1 oz. = 930 gm. (Hume).

COLOURS OF BARE PARTS. Iris deep brown. Bill slaty blue, blackish at tip, sometimes yellowish at base; cere, orbital skin and gape bright yellow. Legs and feet bright to deep yellow; claws black.

211. Shaheen Falcon. *Falco peregrinus peregrinator* Sundevall

Falco peregrinator Sundevall, 1837, Physiogr. Sällakapets Tidskr., 1(2): 177, pl. 4
(At sea in lat. 6°20' N. between Ceylon and Sumatra, 70 Swedish miles
[= 700 kilometres] off the Nicobars)

Baker, FBI No. 1719, Vol. 5: 34

Plate 13, fig. 2, facing p. 246

LOCAL NAMES. *Shāheen kōhi* ♀, *Kōhila* ♂ (Hindi); *Kurulla goya* (Sinhala); *Vallāra* (Tamil); *Kārimpullu* (Malayalam).

SIZE. Kite —; Jungle Crow ±. Length c. 38-46 cm. (15-18 in.).

FIELD CHARACTERS. Very like the Peregrine (209) — a powerful, broad-shouldered, streamlined falcon with long pointed wings, and swift direct flight.

Adult. *Above*, slaty black with black head and prominent cheek or moustachial stripes on either side of throat. *Below*, pinkish white and rusty red, boldly cross-barred with black from abdomen down. Sexes alike; female larger.

Young (immature). Darker. More brownish black above; more ferruginous below.

STATUS, DISTRIBUTION and HABITAT. Resident and breeding in NW. Pakistan (Thal, Chitral, Kohat dists.) and the entire Indian Union from about 2400 m. alt. in the Himalayas from Kashmir, Punjab, Himachal Pradesh, U.P. and Nepal, eastward through Assam; southward throughout the Peninsula to S. Kerala (with the exception of the desert and semi-desert areas in western Rajasthan and northern and western Gujarat where mostly *babylonicus*). E. Pakistan; Ceylon. Affects foothills and rugged hilly country to the highest peninsular hills.

Extralimital. Burma east to the lower Yangtze valley in E. China.

GENERAL HABITS. Very similar to the Peregrine (209), but keeps more to steep rugged hills than about lowland waterfowl resorts. Pairs occupy favourite crags, almost traditionally, for nesting and as bases for foraging over vast tracts of the surrounding countryside. Flight extremely swift and direct — a few rapid pigeon-like wing-beats followed by a glide at tremendous speed. Like the Peregrine hurls itself obliquely at its quarry from a height, or 'pitch', wings pressed to the sides, sometimes over a traverse of several hundred yards — literally a bolt from the blue. The loud tearing swish of this lightning stoop overhead can be quite disconcerting to an observer taken unawares, and by the time he can locate its source the falcon is already vanishing in the distance, maybe with the quarry dangling limply from its talons! Inclined to be somewhat crepuscular, hunting mostly soon after dawn and then again late afternoon and well into the dusk. In the breeding season pairs indulge in a great deal of aerial interplay, stooping at each other around their nesting cliff and deep down into the adjoining gorges with incredible speed and adroitness, going through remarkable aerobatics, throwing themselves momentarily upon their backs in mock battle, and executing perfect looping-the-loop turns.

FOOD. Chiefly birds: chukor, partridges, quails, pigeons, etc. In some areas parakeets, mainly *Psittacula krameri*, form a major food item. Nightjars (*Caprimulgus* spp.) and bats also recorded. Easily trained to strike large birds like mallard, florican, and junglefowl, but crows said to afford far finer sport than all of these.

VOICE and CALLS. Unrecorded except for a prolonged *chir-r-r-r* made by the female every now and then in the proximity of the nest-cliff, especially when nest being investigated (Dodsworth).

BREEDING. *Season*, in the Himalayas (up to c. 2400 m.) chiefly March to May; in the peninsular and S. Indian hills January to March/April; in Ceylon c. March-April. *Nest*, a large compact platform of sticks sometimes lined with wool and grass, placed on a ledge or in a niche on a cliff face — usually inaccessible situations. Often no nest, the eggs being laid directly

on scanty grass growing on a ledge. (An exceptional record of a tree nest presumably self-built by the birds, in the top of a pine in Burma.—Livesey, JBNHS 36: 1003). Eggs, 3 or 4, pale stone to pale brick-red in ground colour, marked in varying degree with a few bold blotches or numerous small ones of reddish brown or brick-red. Average size of 65 eggs 51.8×40.7 mm. (Baker). Both sexes take part in nest-building and repair. Incubation evidently by female alone; the male when not hunting keeps watch from a neighbouring pinnacle. During daytime eggs often left exposed, shaded from direct sun by female standing over them with half-open wings. Incubation period 25–27 days (Baker). Chicks (a couple of days old) clad in white down. Iris light brown; legs and feet creamy white (Dodsworth).

MUSEUM DIAGNOSIS. First primary (as.) longer than 3rd. Crown black or blackish. Cheek-stripe broader than eye, sometimes fused into black of crown. No nuchal collar. Breast generally deep rufous. For details of plumage see Baker, loc. cit.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♂	265–295	25–27	48–50	128–162 mm.
♀ ♀	312–342	28–29	—	— mm. (Baker)

Middle toe with claw ♂ c. 53–55; ♀ c. 60–63 mm.

Wingspread of an ad. ♂ with wing 295 mm. — 911 mm. (Meinertzhagen).

COLOURS OF BARE PARTS. As in the Peregrine and Redcapped falcons. In juvenal birds of races of *pergrinus*, legs and feet yellow *contra* bluish in other immature falcons.

FALCO SUBBUTEO Linnaeus

Key to the Subspecies

Darker.....	<i>F. s. subbuteo</i>
Paler.....	<i>F. s. centralasiae</i>

212. Hobby. *Falco subbuteo subbuteo* Linnaeus

Falco Subbuteo Linnaeus, 1758, Syst. Nat., ed. 10, 1: 89

(Europe, restricted type locality, Sweden)

Hypotriorchis subbuteo jakutensis Buturlin, 1910, Nascha Okhota : 71

(Chuckche, NE. Siberia)

Baker, FBI No. 1724, Vol. 5: 42

LOCAL NAME. *Morassani* (Oudh, U.P.).

SIZE. Dove or Pigeon \pm ; length c. 31–34 cm. (12–13 in.).

FIELD CHARACTERS. A small, pointed-winged streamlined falcon.

Adult. *Above*, slaty grey with blackish head and moustachial streaks. *Below*, rusty white, broadly streaked with black. Thighs and under tail-coverts rufous. Sexes alike; female larger. In overall effect a very good miniature of the Peregrine falcon, but with underparts longitudinally streaked instead of cross-barred.

Young (immature). Much darker above, brownish rather than slaty, scalloped with rusty whitish.

STATUS, DISTRIBUTION and HABITAT. Winter visitor (September to March/April) to W. Pakistan (Baluchistan, Sind, NWFP, Punjab) and India south to about Mysore (Belgaum). Also Nepal and E. Pakistan; but the races not clearly separable. Affects open wooded country, cultivated areas, as well as semi-desert.

Extralimital. 'Breeds from Scandinavia and N. Russia across Asia to E. Siberia and Kamchatka, south to the Mediterranean, SW. Siberia, Transbaikalia (and probably NW. China) and Manchuria. In winter south to Africa, India, and SE. China' (Peters).

GENERAL HABITS, FOOD, etc. As in the Central Asian race (213), q.v.

BREEDING. Extralimital. Nest, eggs, etc. as in 213.

MUSEUM DIAGNOSIS. Similar to *F. s. centralasiae* but somewhat darker and on an average a trifle smaller. For description of plumage etc. see Witherby 1939, 3: 20-21.

MEASUREMENTS

	Wing	Bill (from cere)	Tarsus	Tail
♂♂	247-272 (one 240)	12.5-14 (one 11.5)	34-37	130-140 mm. (one 122)
♀♀	265-280	—	—	— mm. (Witherby)

COLOURS OF BARE PARTS. Adult. Iris dark brown. Bill leaden blue, tip bluish black; cere, gape, bare skin round eye, legs and feet bright yellow. Immature. Cere and round eye pale lead-blue or greenish. Legs and feet paler yellow (Witherby).

213. Central Asian Hobby. *Falco subbuteo centralasiae* (Buturlin)

Hypotriorchis subbuteo centralasiae Buturlin, 1911, Orn. Mitt., 2: 175, new name for *Falco subbuteo cyanescens* Lönnerberg, 1905, Ark. Zool., 6(9): 6 (Baimgol, Tianshan) nec *Falco cyanescens* Vieillot

Hypotriorchis subbuteo planicola Portenko, 1930, Bull. Acad. Sci. USSR, ser. 7. Cl. Physico-Math.: 308 (Yarkand Oasis, Kashgaria)

Baker, FBI No. 1725, Vol. 5: 43

Plate 18, fig. 1, facing p. 336

LOCAL NAME. *Morassani* (Oudh, U.P.).

SIZE. Dove or Pigeon \pm ; length c. 31-34 cm. (12-13 in.).

FIELD CHARACTERS. Same as for 212 from which it cannot be distinguished with certainty. In general effect and actions reminiscent of the Peregrine and Shaheen falcons.

STATUS, DISTRIBUTION and HABITAT. Partly resident in the Himalayas, breeding between c. 1200 and 4000 m. alt. in NWFP, Ladakh, Kashmir, Himachal Pradesh, U.P. (Garhwal). Mainly extralimital winter visitor (September-March/April), spreading out unevenly over W. Pakistan (Sind, Baluchistan, Punjab) and India east through Assam and Manipur, south to N. Mysore. Also E. Pakistan; but the races not clearly separable. In non-breeding season affects similar biotope to the last, the two forms often overlapping.

Extralimital. Turkestan south to N. Persia and E. Himalayas — Peters.

GENERAL HABITS. Partial to low-lying swampy ground in wooded country. Even in its residential and adjacent areas more commonly seen in winter when its numbers have been augmented by extralimital migrants. Distinctly

crepuscular; feeds chiefly in the twilight of dawn and at sunset, often well into the dusk. The birds fly about in curves and circles, climbing and sinking at will, flying straight some distance with rapid wing-beats followed by a downward swoop of 30 metres or so, and then a swift effortless rise. While soaring the primaries are slanted slightly downwards almost below level of back. Chases cicadas, dragonflies and small birds at great speed with rapid wing-beats followed by arrow-like glides a few metres above the ground. On catching its prey rises like a kite 20 or 30 metres up in the air, sailing slowly round in circles, devouring the victim from its talons. Like the Shaheen sometimes soars to a 'pitch' and 'waits on', stooping obliquely with tremendous velocity and taking the quarry in its stride. Occasionally will also hover for a moment over a field of gram or lucerne 'waiting on' for some small bird or grasshopper to take wing. Sometimes hawks winged insects in a loose flock of ten or more birds in the manner of swifts, high up in the air, turning, twisting, rising, falling, circling round and darting at the quarry with great agility. Has been observed thus engaged in association with swallows (*Hirundo rustica* and *H. daurica*), which themselves frequently form its prey (SA).

FOOD. Small birds (larks, pipits, swallows, wagtails, swifts, warblers, etc.), pipistrelle bats, and flying insects (dragonflies, cicadas, locusts, beetles, etc.). Can be easily tamed and taught to 'wait on' at great heights for pursuit of larks, drongos, quails, hoopoes, etc. but 'lacks the dash and daring of the Merlin and is disappointing from the falconry point of view' (Donald).

VOICE and CALLS. Very noisy in breeding season. 'A harsh, plaintive, rising *tee-tee-tee-tee-tee* as common to most falcons, occasionally varied with harsh single notes *pit pit* or *chip chip chip* uttered two or three times in succession while flying about in circles above the trees, settling here and there on different trees' (Whistler, JBNHS 32: 730-2).

BREEDING. *Season*, principally May to July. *Nest*, usually an old stick nest of crow or magpie high up in a fir, cedar, or poplar tree on the outskirts of forest, repaired and utilized. *Eggs*, 3 or 4, dull yellowish buff to pale brick-red densely speckled and spotted with dull brick-red and brown, sparsely blotched with purplish black. Average size of 28 eggs 41.4×33.0 mm. (Baker). Incubation mostly by female; period unrecorded. 'Male brought plucked bird and passed it to incubating female who left nest to receive and deal with it on a nearby branch' (Whistler, loc. cit.).

Nestling covered with down 'of isabelline shade' (A. E. Jones).

MUSEUM DIAGNOSIS. Second primary (as.) longest; first much longer than 4th. Middle toe without claw under 40 mm. Breast white or buff with brown streaks. *F. s. centralasiae* differs from nominate *subbuteo* in being somewhat paler and on an average a trifle larger, but race very variable and of doubtful validity. For details of plumage see Baker, loc. cit.

MEASUREMENTS. Wing ♂♂ 250-275; ♀♀ 277-286 mm.

COLOURS OF BARE PARTS. As in 212.

FALCO SEVERUS Horsfield

Key to the Subspecies

- Darker; lower plumage very deep ferruginous.....*F. s. severus*
 Paler; lower plumage less deep ferruginous.....*F. s. rufipennis*

214. **Indian Hobby.** *Falco severus rufipedoides* Hodgson

Falco Rufipedoides Anonymous = Hodgson, 1844, Calc. Jour. Nat. Hist., 4: 238
(Hills of India, restricted to Nepal by Baker, 1927, Bull. Brit. Orn. Cl., 47: 107)

Baker, FBI No. 1729, Vol. 5: 47

Plate 13, fig. 6, facing p. 240

LOCAL NAMES. *Dhātār* ♂, *Dhātī* ♀ (Hindi).

SIZE. Dove \pm ; length c. 27-30 cm. (11-12 in.).

FIELD CHARACTERS. Very similar to 212 but with breast and underparts ferruginous instead of rusty white. In overall effect a good miniature of Shaheen falcon, just as 212 is of the Peregrine. Sexes alike; female larger.

Y o u n g (immature). *Above*, very dark, narrowly scalloped with rufous in freshly moulted plumage. *Below*, boldly black-streaked from upper breast to vent.

STATUS, DISTRIBUTION and HABITAT. Resident and breeding in the lower Himalayas (c. 1800 to 2400 m.) in W. Pakistan (Murree?), Kashmir? and through Kumaon, Garhwal, and Nepal to W. Assam north of Brahmaputra river. Occurs also in Kerala (chiefly hills) where status indeterminate. Presumably only winter visitor; no breeding record to date. Straggler to Ceylon in winter. Affects well-wooded foothills country.

GENERAL HABITS. Very similar to *F. s. subbuteo* (212, 213), qq.v. Often seen in loose flocks of ten or twelve birds hawking insects in the manner of swallows and swifts — darting at speed in pursuit, wheeling and circling in the air, chiefly in the twilight of dawn and at sunset till late into the dusk. Prey either eaten on the wing or carried to a perch.

FOOD. Chiefly large flying insects — locusts, cicadas, beetles, dragonflies, etc. Also small birds, and occasionally lizards, pipistrelle bats, and mice. 'Hunting small chickens near lowland villages' (Fleming, Nepal).

VOICE and CALLS. Only a loud squealing rapid *ki-ki-ki-ki* recorded. 'Cry is rather shriller and weaker than that of the Kestrel' (Bourdillon, SF 4: 354).

BREEDING. Very little definite information. *Season*, 'probably late May and June' (Baker). A pair feeding young in nest in tall pine in British Embassy grounds, Kathmandu, Nepal — July-August (Proud, JBNHS 48: 716). *Nest*, of sticks, usually an old crow's or magpie's, in a pine or similar tree growing from the side of a precipice. According to Baker apparently has two alternate nests at varying distances from each other, used in irregular sequence. *Eggs*, 3 or 4, broad ovals, very like those of *F. s. subbuteo* — buff, reddish buff or light brick-red in ground colour, densely speckled with dark brick-red, brownish red or purplish red, with many variations. Size about 41 \times 31 mm.

MUSEUM DIAGNOSIS. Middle toe without claw under 40 mm. Second primary (aa.) longest; 1st much longer than 4th. Breast rufous or ferruginous, unspotted in adults. Differs from the nominate race (215) only in having the lower plumage paler and less deep ferruginous. But this in effect merely represents a colour cline and the race is perhaps redundant. There is no significant difference in size.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	211-219	17	33-34	94-95 mm.
♀♀	237-248	19		105-112 mm. (Baker)

COLOURS OF BARE PARTS. Iris hazel-brown to almost black. Bill bluish slate, paler at base, black at tip; cere, gape and orbital skin lemon-yellow. Legs and feet yellow to orange-yellow; claws black.

215. **Burmese Hobby.** *Falco severus severus* Horsfield

Falco severus Horsfield, 1821, Trans. Linn. Soc. London, 13(1): 135 (Java)
Baker, FBI No. 1728, Vol. 5: 45

LOCAL NAMES. Unrecorded.

SIZE. Same as 214.

FIELD CHARACTERS. Same as for 214 but with breast and underparts much deeper ferruginous. The two races indistinguishable with certainty.

STATUS, DISTRIBUTION and HABITAT. Resident. Assam south of the Brahmaputra river, Manipur; E. Pakistan. Affects well-wooded foothills country.

Extralimital. Burma, Thailand, Indochinese countries, Sumatra, Java, Philippines.

GENERAL HABITS, FOOD, etc. Similar to the other hobbies. In northern Assam (Dibrugarh dist.) frequents tea gardens and edge of forest and paddy land.

VOICE and CALLS. Not specifically recorded.

BREEDING. *Season*, March to May in the Assam hills. *Nest*, usually an appropriated old one of a crow or magpie in a tree growing out of a precipice or steep hillside; repaired and sometimes added to and lined with green twigs and leaves. *Eggs*, 3 or 4, as in 214. Average size of 54 eggs 40.1×31.9 mm. (Baker). Both sexes take part in nest-repair, incubation, and feeding the young. Incubation period 26 days (Baker).

MUSEUM DIAGNOSIS. Differs from the Indian race *rufipedoides* (214) only in having the lower plumage much darker and deeper ferruginous.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
	221-238	c. 18 (?)	c. 30-33	95-110 mm.
		('Apparently all females' — Baker)		
3 ♀♀ recently taken in NE. Assam measure:				
		(from skull)		
	221-245.5	23-25	38-40	95-115 mm.
				(SA, SDR)

COLOURS OF BARE PARTS. As in 214.

216. **Sooty Falcon.** *Falco concolor* Temminck

Falco concolor Temminck, 1825, Pl. Col., livr. 56, text (but not pl. 330) (Senegal, Barbary Coast, Egypt, Arabia. Barakan Island, Gulf of Aqaba, suggested by Meinertzhagen, 1954, Birds of Arabia: 340)

Not in Baker, FBI

LOCAL NAMES. Unrecorded.

SIZE. Jungle Crow \pm ; length c. 38 cm. (c. 15 in.).

FIELD CHARACTERS. General aspect as of Hobby (212), but slightly larger and uniformly pale slaty grey above and below, with prominent yellow cere and legs. Sexes alike; female larger.

Young (immature). Not unlike that of *F. subbuteo* but with the pale nuchal patch of the latter almost absent.

STATUS, DISTRIBUTION and HABITAT. Only once obtained in W. Pakistan (ad. ♂, Charbar, Baluchistan Coast, 31 August 1912 — W. D. Cumming). The specimen, which was examined by Dr C. B. Ticehurst in the Quetta Museum, was evidently destroyed in the great earthquake of 1936.

Extralimal. 'Red Sea coasts and Somaliland south to Mozambique; Madagascar' — Peters.

GENERAL HABITS, FOOD, etc. According to Meinertzhagen (1954: 340) crepuscular, with a very hobby-like flight; catching bats on the wing with ease. (For extralimal breeding, habits, etc. see Clapham, 1964, *Ibis*, 106: 381.)

MUSEUM DIAGNOSIS. 'Adults (both sexes): Whole upperparts pale slaty grey, primaries blackish. First primary unbarred on the inner web. All feathers of upperparts with dark shafts. Chin and centre of throat pale yellowish buff. Rest of underparts pale slate-grey. Tail as back. The immature bird is browner and has the feathers fringed paler. Cheeks and throat rusty yellow' (Meinertzhagen, *Birds of Egypt*: 374).

MEASUREMENTS. Wing 267–305 (Meinertzhagen). The Charbar specimen (♂) measured: Wing 278; bill from cere 13; tarsus 33; middle toe 32.5; tail 133 mm. (Ticehurst).

COLOURS OF BARE PARTS. Iris dark brown. Bill bluish horn; cere lemon-yellow. Legs and feet lemon-yellow; claws black.

FALCO COLUMBARIUS Linnaeus

Key to the Subspecies

Darker both above and below in both sexes.....*F. c. insignis*
 Paler.....*F. c. christianiludovici*

217. North Asiatic Merlin. *Falco columbarius insignis* (Clark)

Asalou regulus insignis Clark, 1907, Proc. U.S. Nat. Mus., 32: 470 (Fusan, Korea)
 Baker, FBI No. 1731, Vol. 5: 49

Plate 18, fig. 6, facing p. 336

LOCAL NAMES. *Daurela* ♂, *Daurāi* ♀ (Hindi); *Rēlāl tūrūmti*, *Ragi* (Punjab).

SIZE. Dove ±; length c. 27–30 cm. (11–12 in.).

FIELD CHARACTERS. Rather like Hobby (212) but without the check-stripes.

Male. (Adult). *Above*, forehead, supercilium, and sides of head whitish with black shaft-streaks. Upperparts bluish slaty with a broad rufous-and-black hindcollar. Tail tipped white, with broad subterminal black band. *Below*, sides of throat and underparts white tinged with rufous and boldly streaked with blackish; thighs and under tail-coverts darker rufous.

Female. Larger. *Above*, slaty brown scalloped with rufous. Tail barred throughout with dark brown and rufous-grey. *Below*, paler than in male, more broadly streaked with brown.

Young (immature). *Above*, brown without any slaty tinge. Rufous of scalloping and head more pronounced.

STATUS, DISTRIBUTION and HABITAT. Scarce winter visitor (vagrant?) to West Pakistan [Baluchistan (Quetta-Pishin; Loralai dist.) and Sind (race presumed)]. Has been obtained as a vagrant in Gilgit and Punjab in winter. According to Donald apparently not very rare in Punjab, arriving in autumn, leaving again in spring. Affects open country with scrub and cultivation.

Extralimital. Breeds in N. Siberia across Yakutsk to the Stanovoy Mountains. In winter to Turkestan, N. India, S. China, Japan.

GENERAL HABITS. Hunts singly (not in pairs like *F. chicquera*) in open places, particularly crops, for larks and such-like small birds. Perches on the ground or on a mound or bund separating fields from where the sorties are launched. Occasionally hovers momentarily. Flies low along the ground, very fast with short sharp wing-beats interspersed with glides with half-closed wings. Seldom or never soars, and though often striking prey from above does not stoop at it from any distance or great height. Prey usually captured by swift, direct pursuit. Much esteemed for falconry. Very easily tamed and trained for pursuit of quails, hoopoes, larks, etc. Exhibits great speed and courage in the chase, turning, twisting, zigzagging, rising and falling in the air after the quarry with utmost adroitness.

FOOD. Mostly small birds. 'Took a Desert Wheatear from under my nose' in Sind (Ticehurst).

BREEDING. Extralimital. Nests on ground among grass and herbaceous vegetation, or in trees utilizing old stick-nests of crows, etc.

MUSEUM DIAGNOSIS. Middle toe without claw under 40 mm. as in Hobby, but 2nd and 3rd primaries subequal, and 1st and 4th subequal. Differs from *F. c. christiani-ludovici* (218) in both sexes being much darker above and below. For details of plumage, see Baker, loc. cit.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂♂	196-204	14-15	c. 34-39	121-138 mm.
♀♀	220-224	15-16		(Baker)

COLOURS OF BARE PARTS. Iris brown. Bill slaty blue, black at tip, yellowish at base of lower mandible; cere yellow. Legs and feet yellow; claws black.

218. *Pallid Merlin. Falco columbarius christiani-ludovici* Kleinschmidt

Falco christiani-ludovici Kleinschmidt, 1917, *Falco*, 13(2): 10 (Caucasus)
Baker, FBI No. 1732, Vol. 5: 50

LOCAL NAMES. As in 217.

SIZE. Dove \pm ; same as 217.

FIELD CHARACTERS. Much paler than 217, the adult ♂ a beautiful pale blue-grey above. Female and Young (immature) also paler; in general

effect rufous rather than rufous-brown. Bars on primaries in both sexes especially pale.

STATUS, DISTRIBUTION and HABITAT. Uncommon. Vagrant in winter to W. Pakistan (specimens in the British Museum collection from Peshawar and Kohat districts, and Sind); also from Gilgit. Meinertzhagen procured one in Ladakh at c. 3000 m. alt. (Dras, 34°26'N., 75°46'E.) on 15 April.

Extralimital. 'Breeds on the Kirghiz Steppes from Orenburg to the Altai, north to Omsk and Lake Tschany. Winters to the Caucasus, Turkestan and Tarim Basin' (Peters).

GENERAL HABITS, FOOD, etc. As in 217.

MUSEUM DIAGNOSIS. Differs from *insignis* (217) in both adults and juveniles being very much paler.

MEASUREMENTS. Wing ♂♂ 203-226; ♀♀ 200-232 mm. (Baker); in Meinertzhagen's ♀ from Ladakh 230 mm.

COLOURS OF BARE PARTS. Bill paler bluish; cere paler yellow. Otherwise as in 217.

219. Redheaded Merlin. *Falco chicquera chicquera* Daudin

Falco chicquera Daudin, 1800, *Traité d'Orn.*, 2: 121 (Bengal)

Baker, FBI No. 1730, Vol. 5: 47

Plate 18, fig. 4, facing p. 336

LOCAL NAMES. *Tūrūmti*, *Tūrūmtāri* ♀ (Hindi); *Chātwa* ♂ (Sind); *Jellaganta*, *Jelgāddā* (Telugu); *Jelkāt* (Yerukali).

SIZE. Pigeon ±; length c. 31-36 cm. (12-14 in.).

FIELD CHARACTERS. An elegant little grey-and-white falcon with a diagnostic chestnut head.

Adult. *Above*, crown, nape, sides of head and cheek-stripe chestnut. Rest of upperparts ashy or bluish grey. Wing-quills blackish. Tail grey, narrowly barred with black, and with a broad black band near end; extreme tip white. *Below*, white, sparsely streaked with blackish on breast, barred on flanks and abdomen. Sexes alike; female larger.

Young (immature). More heavily barred below than adult. In still younger birds upperparts also barred throughout; chestnut of head duller, more rufous, and streaked with black; throat and breast also heavily marked with black.

STATUS, DISTRIBUTION and HABITAT. Resident and breeding. Not very common, but fairly generally distributed throughout the subcontinent, from W. Pakistan (Baluchistan, Sind, NWFP) eastward through Rajasthan and the Gangetic Plain (including the Himalayan foothills, terai, and Nepal Valley) to Assam and E. Pakistan. Southward through the Peninsula to Kerala and Madras (southernmost Tirunelveli c. 8°45'N.). Not in Ceylon. Common on the Deccan Plateau; rarely descending to the coastal districts. Apparently also partial local migrant, or nomadic, to some extent. Recorded as abundant in some localities in winter and as scarce in other seasons, but movements unstudied. Affects deciduous plains, plateau and low foothills country interspersed with groves of trees, cultivation and villages. Avoids forest.

GENERAL HABITS. Male and female almost invariably keep together and hunt in concert, one bird chasing the quarry close along the ground at incredible speed while the other heads it off. Its pursuit flight, attained by rapid, regular wing-beats, is straight and arrowlike; very different from the Merlin (*F. columbarius*) which goes in jerks and 'jumps'. Often beats out prey from shrubbery or foliage canopy, by suddenly darting through a gap in them or hedge-hopping at speed, stampeding any little birds sheltering within or on the ground behind. Like the Merlin will also hover momentarily at times to investigate. Possesses the audacity of the Peregrine, sometimes swooping suddenly from nowhere, snatching a bird fallen to gunshot or chasing one thus wounded completely undeterred by the sportsman's warning shots. Comes down to water to drink, and walks easily on ground. Much esteemed by falconers for its pluck, and the ease with which it can be tamed and trained to take birds like hoopoes, rollers, quails, and even partridges and pigeons; pairs often made to hunt in coordination as in the wild state.

FOOD. Mainly small birds. Among items specifically recorded are sparrows (esp. *Passer montanus*), wagtails, pipits, larks (esp. the social *Calandrella* spp.), ring plovers (*Charadrius dubius*), and not unfrequently mice and bats. From the stomachs of a pair shot simultaneously were obtained the right and left leg respectively, along with other remains of a warbler (*Prinia sylvatica*) which had evidently been shared and shared alike! (SA).

VOICE and CALLS. 'Peculiar shrill querulous screams' as it sallies to drive off crows and kites from proximity of nest-tree. 'A continual *tiriririririririri*' uttered by full-fledged young when being chased off by (presumed) parent (K. K. Neelakantan).

BREEDING. *Season*, chiefly January to March, but continuing till about May. *Nest*, a fairly substantial cup or platform of sticks and twigs, lined with grass roots. Usually well concealed 5 to 10 metres up in the densely foliated branches of a mango or peepul tree in open country, often close to a village. Old nests of kites and crows are sometimes brought into commission. *Eggs*, 3 or 4, longish regular ovals, pale reddish white in ground colour, thickly speckled with reddish brown. Small replicas of the eggs of Laggar falcon. Average size of 120 eggs 42.4×31.1 mm. (Baker). Both sexes share in nest-building and repair and evidently also in incubation, though the female is chiefly responsible for this. Incubation period unknown. Both parents feed the young.

MUSEUM DIAGNOSIS. As in *F. columbarius* 2nd and 3rd primaries (as.) subequal; 1st and 4th subequal, but crown chestnut instead of black-streaked grey or brown as in that species. For details of plumage see Baker, loc. cit.

MEASUREMENTS

	Wing	Bill (from skull)	Tarsus	Tail
♂♂	190-207	19-24	35-40	124-137 mm.
♀♀	220-232	c. 25	38-41	148-156 mm.
				(Baker, SA, BB)

COLOURS OF BARE PARTS. Iris brown. Bill dark plumbeous, black at tip, greenish yellow on basal half; cere and orbital skin yellow. Legs and feet yellow; claws black.

220. Eastern Redlegged Falcon. *Falco vespertinus amurensis* Radde

Falco vespertinus var. *amurensis* Radde, 1863, Reisen süd von Ost-Sibir., 2: 102, pl. 1, f. 2a, 2b (Amur)

Baker, FBI No. 1739, Vol. 5: 58 (= *Erythropus amurensis*)

Plate 18, fig. 3, facing p. 336

LOCAL NAME. *Dootu hagra* (Cachari).

SIZE. Pigeon —; length c. 28–31 cm. (11–12 in.).

FIELD CHARACTERS. A small, rare migratory falcon.

Adult (male). *Above*, slaty grey. *Below*, ashy grey with deep ferruginous-red vent, thighs, and under tail-coverts. Distinctive orange-red orbital skin, cere and legs. Birds in this plumage easily distinguishable, but rare in the migrating flocks. Could casually be confused only with Sooty Falcon (216) q.v.

In flight (somewhat reminiscent of pratincole when hawking insects) dark body and black wing-quills contrasting with grey axillaries and wing lining, together with red legs and cere, are diagnostic features.

Female. *Above*, including tail, slaty grey barred with black. Crown dark slate; whitish nuchal collar on hindneck; black cheek-stripe. *Below*, pale rusty white with longitudinal black spots on upper breast, bars on lower breast and flanks; unmarked on lower abdomen. Underwing white, barred black.

Young (immature). Like female but upperparts browner and scalloped with rufous. *Below*, more heavily barred and broadly spotted. Intermediate stages between this and adult plumage common.

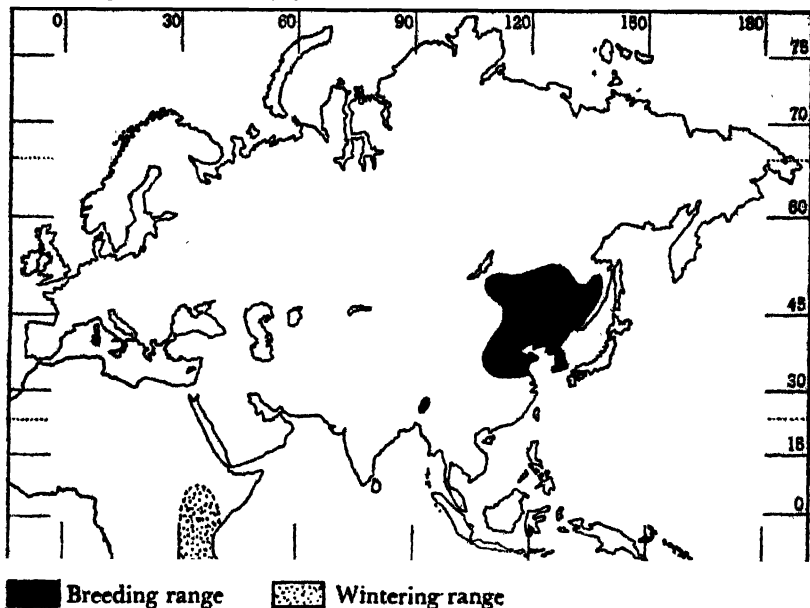
STATUS, DISTRIBUTION and HABITAT. In NE. India evidently partly resident, but mainly passage migrant. Breeds casually in N. Cachar vide Baker, where previously recorded by Hume as disappearing about mid-December and reappearing in large numbers about mid-October in the following year. Recorded as a regular cold-weather visitor to N. Assam (Dibrugarh dist.) and Manipur, and as 'comparatively common during the rains in E. Bengal' (!). In peninsular India only a through migrant to and from E. and S. Africa. Stragglers, obviously in transit, observed or collected between September and April (autumn and spring passage) in the Nilgiris, Carnatic, Nellore, Rajamundry, Madura districts, and once near Bombay. Rare straggler to Ceylon; one old record for Nepal (Hodgson's). Apparently sparse winter visitor to the Maldiv Islands (Phillips 1963).

Extralimital. 'Breeds in Siberia east of Lake Baikal to Amurland south to Manchuria and N. China to the Tsin-ling Mountains. Winters in E. and S. Africa from Kenya Colony to Cape Province' (Peters).

MIGRATION. Records such as 'a huge flock numbering some thousands passing Belgaum (15°54'N., 74°36'E.) on 24 November (Butler, SF, 9: 371), 'immense scattered flocks in November–December in some years all along the coast near Karwar' (N. Kanara dist., Mysore, c. 14°30'N. lat.) — Davidson, JBNHS 12: 16), and of 'large numbers' in the same locality in November (E. H. Aitken, MS), suggest that the bulk of the migration between NE. India and E. Africa — at least in autumn — takes place across the Indian Ocean from somewhere in this area in a continuing NE.–SW. trend. It is a regular winter visitor to East Africa (Nyasaland, now Malawi) arriving December, most abundant January–February, leaving

again March (Benson 1951, *Ibis*, 93: 467-8). Significantly there seem to be no records in NW. India, and none either from the northern Arabian Sea or across in Sudan or Egypt, thus supporting the hypothesis that a large proportion of the migrants traverse southern peninsular India in a NE.-SW. trend. However, from a flock of about 100 encountered by him in April near Mecca (c. 21°26'N., 39°49'E.) Meinertzhagen is inclined to believe that some mass migration almost certainly takes place over Arabia, at least in spring, when also incredible numbers pass north in central Kenya, possibly veering eastward somewhere about the Equator. Many observed by him and SA (presumably this race) migrating northward with Lesser Kestrels in N. Afghanistan, 24 April (*Ibis*, 1938: 701).

Falco vespertinus amurensis



GENERAL HABITS. During migration stop-overs keeps in large flocks, or swarms, of several hundred (or thousand) strong, often in company with Lesser Kestrels (*Falco naumanni*). The birds mill around in the air at sunset, diving and darting at winged insects some 50 to 100 metres above open fallow or grazing land, occasionally descending to skim along the bushes, or settle on trees in clusters. Roosting in like manner after dark, preceded by a good deal of circling around the foliage canopy in the manner of bee-eaters. Sometimes hovers like kestrel when hunting. Said to be very good eating, and much prized by Cacharis, as well as in East Africa.

FOOD. Locusts, grasshoppers, beetles, winged termites, etc. hawked in the air; sometimes picked off the ground in a swoop.

VOICE and CALLS. A shrill screaming accompanies the settling-in process, continuing more or less through the night.

BREEDING. Mainly extralimital; casually in N. Cachar. *Season*, April-May. *Nest*, of sticks, usually a disused one of magpie etc., in trees in open

ground, often round a village. *Eggs*, 4 to 6, in appearance like eggs of common Kestrel with all its variations: creamy to brick-red in ground colour, lightly or densely speckled and smeared with deep blood-red or blackish red. Average size of 50 eggs 35.8×28.9 mm. (Baker). Both sexes incubate.

MUSEUM DIAGNOSIS. Second primary (as.) longest; 1st longer than 3rd. For details of plumage see Baker, loc. cit. Nominate *vespertinus* differs from *amurensis* in male having the axillaries and under wing-coverts white *contra* dark slaty grey; in female having the crown and nape dark-streaked rusty brown *contra* dark slate.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	230-246	16-18	28-33	124-131 mm.

COLOURS OF BARE PARTS. Iris dark brown. Bill fleshy red, paler and yellower at base, blackish at tip. Orbital skin and cere, orange-yellow — redder during breeding season. Legs and feet orange-yellow to orange-red; claws pale fleshy horny.

221. Chinese Lesser Kestrel. *Falco naumanni bekinensis* Swinhoe

Falco cenchris var. *pekinensis* Swinhoe, 1870, Proc. zool. Soc. London: 442
(Near Peking, China)

Baker, FBI No. 1745, Vol. 5: 66

Plate 18, fig. 7, facing p. 336

LOCAL NAMES. Unrecorded.

SIZE. Pigeon \pm ; length c. 34 cm. (13 in.).

FIELD CHARACTERS. A small dainty, rather gregarious migratory falcon.

Male (adult). *Above*, head, neck, lower back, rump, and tail ashy grey, the last with a broad black subterminal band and white tip. Mantle unspotted vinous brick-red, brighter looking than in Kestrel. *Below*, pale to deep rufous with round black spots on breast and flanks; absent in old birds. In overhead flight very pale wings and tail with black borders diagnostic.

Female. *Above*, pale rufous, cross-banded with black. *Below*, pale vinous-buff densely streaked on breast and spotted on abdomen with blackish. Indistinguishable from ♀ Kestrel (q.v.) except on a clear view with binoculars when *whitish*, instead of *black*, claws diagnostic in all phases.

Young (immature). Like ♀, but generally greyish on head and greyer on tail.

STATUS, DISTRIBUTION and HABITAT. Status uncertain. Dates and regularity of occurrences, and distribution in India, unknown; also whether both this and the nominate race (*naumanni*) occur. Apparently a rare winter visitor; perhaps more correctly an irregular through passage migrant to E. Africa like Redlegged Falcon, a few stragglers remaining behind. Sight records and specimens — including some racially indeterminate, others of nominate *naumanni* (?) — obtained between November and April as follows: Punjab (Ambala, Delhi), U.P. (Lucknow), Bihar (Dinapur), Orissa (Balasore), Bengal (Calcutta), Assam (Dibrugarh, Naga Hills, NE. Cachar), Manipur, Maharashtra (Sholapur c. $17^{\circ}43'N.$, $75^{\circ}56'E.$, 'flock of several hundred'; Ahmednagar c. $19^{\circ}8'N.$, $74^{\circ}48'E.$, 'flock c. dozen' — both in January (C. S. Davidson), Madras (Coonoor — Nilgiris), Maldives

Islands (specimens identified as *naumanni*), December ('probably an annual winter visitor' — Phillips 1963). Affects open savannah country and cultivation.

Extralimital. 'Breeds from Turkestan eastward to Manchuria and N. China, exact limits not known. Migrates to India and occasionally to E. Africa' (Peters).

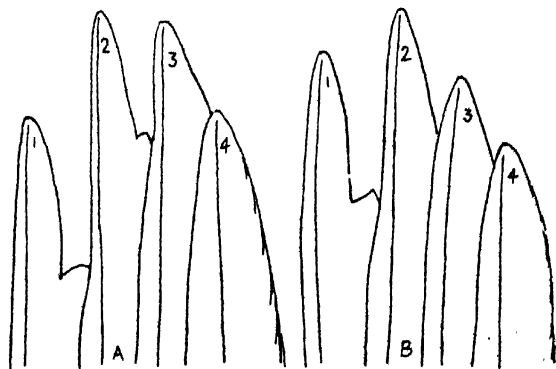
MIGRATION. Large flocks, obviously on mass migration, observed in Orissa and Deccan during January. No other visual or ringing data.

GENERAL HABITS. Very similar to Kestrel (222), q.v., but much more gregarious. Hovering very distinctive. Carries body raised 45° instead of horizontally as kestrel, beating wings backward and forward instead of up and down (Mountfort 1962, *Portrait of a River*: 118). A large (migratory?) swarm of 300+ birds observed by SA on 8 January (1950) in Orissa (Balasore c. $21^\circ 30'N.$, $87^\circ 0'E.$) preparing to roost at sunset in a lone leafy tree standing amidst fallow fields. Flying in a rabble around the foliage canopy like bee-eaters before retiring. Perching thickly like swallows along adjacent telegraph wires looking remarkably like house crows in distant silhouette in the falling dusk. Not known whether the swarm moved on next day, but for several days subsequently odd birds were met with scattered far and wide over the surrounding country.

FOOD. Mainly insects; perhaps more insectivorous than Kestrel. Stomachs of specimens examined were crammed exclusively with grasshoppers (Orthoptera), beetles (Coleoptera), and mole-crickets (*Gryllotalpa* sp.). Once a centipede (*Scolopendra*).

VOICE AND CALLS. Not recorded.

BREEDING. Extralimital. Nests in holes in walls of buildings etc.; tends to be colonial, several pairs nesting close to one another. Also utilizes old stick-nests of crows or magpies. Eggs, 3 to 5 smaller and richer-coloured replicas of those of Kestrel.



Wing formula of (A) Kestrel (*Falco tinnunculus*). Outer visible primaries: 1st and 2nd notched on inner web and 2nd and 3rd emarginated on outer; 1st always considerably shorter than 3rd. (B) Lesser Kestrel (*Falco naumanni*). 2nd not notched on inner web, 3rd not emarginated on outer web, 1st usually longer and only occasionally shorter than 3rd.

MUSEUM DIAGNOSIS. Differs from Kestrel in wing formula (see diagram); in male having the brick-red mantle *unspotted*, and lores and feathers next the bill rufous v. white or creamy white. Claws in both sexes *pale yellow* instead of black. Nominate race *naumanni* (Europe, W. Asia) usually has less grey in median and lesser wing-coverts, but this character variable. For details of plumage see Baker, loc. cit.

MEASUREMENTS

	Wing	Bill (from feathers)	Tarsus	Tail
♂ ♀	222-244	16-17	c. 32-35	142-156 mm.
Two adults measured in the flesh:				
		(from skull)		
♂	250	20	34	161 mm.
♀	241	20	34	146 mm.

Both in body moult and very fat, 8 January (SA).

COLOURS OF BARE PARTS. Iris deep brown. Bill bluish horn, yellowish at base, blackish at tip; cere and orbital skin orange-yellow. Legs and feet bright chrome yellow; claws paler.

FALCO TINNUNCULUS Linnaeus

Key to the Subspecies

	Page
Colour of upperparts paler.....	<i>F. t. tinnunculus</i> 365
Colour of upperparts richer, more brick-red.....	<i>F. t. oburgatus</i> 368
Colour of upperparts darker, more heavily barred.....	<i>F. t. interstinctus</i> 367

222. **European Kestrel.** *Falco tinnunculus tinnunculus* Linnaeus

Falco Tinnunculus Linnaeus, 1758, Syst. Nat., ed. 10, 1: 90

(Europe, restricted type locality, Sweden, *apud* Hartert)

Baker, FBI No. 1740, Vol. 5: 61

LOCAL NAMES. *Karontia*, *Koruttia*, *Khermutia*, *Narzinak* ♂, *Narzi* ♀ (Hindi); *Thondälä muchi göddä*, *Thondälä doshi gädu* (Telugu); *Ting kyi* (Lepcha); *Cherupullu* (Malayalam).

SIZE. Pigeon ±; length c. 36 cm. (14 in.).

FIELD CHARACTERS. A small, slender falcon with pointed wings and rather rounded tail remarkable for its habit of hovering stationary in one spot for many seconds at a time — 'hanging in the air'.

Male (adult). *Above*, crown, nape, and sides of neck ashy grey finely streaked with blackish. A blackish cheek-stripe. Mantle bright brick-red with pear-shaped black spots. Rump, upper tail-coverts, and tail grey, the last tipped with white and with a broad black subterminal bar. *Below*, vinous-buff streaked on breast and spotted on abdomen and flanks with blackish.

Female. *Above*, including crown and nape, pale rufous, cross-barred on back with black. Rump and tail normally tinged with grey. *Below*, paler than in male and with the markings denser and browner. Also slightly larger.

Young (immature). ♂ like ♀, but soon acquiring a good deal of grey in tail, and grey rump and upper tail-coverts. (Completely blue-grey tail at c. 15 months' moult — Ticehurst.)

STATUS, DISTRIBUTION and HABITAT. Breeds in W. Pakistan (N. Baluchistan, N.W.F. Province, Punjab) and India in the W. Himalayas (Ladakh, Kashmir, Himachal Pradesh) between c. 700 and 3300 metres alt. Commonly observed (non-breeding) above tree-line up to c. 5500 m. No direct evidence as yet of breeding in E. Himalayas or Assam. If found, racial identity will need establishing. Winters throughout both Pakistans, Nepal and all India — plains and up to the highest peninsular hills — its numbers vastly augmented by extralimital migrants, and overlapping with the other races. Also winters in Ceylon, Andaman, Laccadive, and Maldive islands. Affects open grassland, hill and plain; also cultivation and semi-desert.

Extralimital. Also breeds in the Palaearctic Region, in Europe roughly from between latitude 60° and 70°N. and eastward through the Ural Mountains and W. Siberia to Tarbagatai and Altai; southward to N. Africa and east through most of W. Asia to Mongolia and the Amur. Winters south of these areas including the Indian subcontinent.

MIGRATION. Seen in the plains (non-breeding localities) in winter, between September/October and March/April. No ringing or other precise data. Visual records of earliest and latest dates of arrival and departure vitiated by uncertainty in racial identification. In N. Baluchistan (Chagai) northward migration (of nominate race) observed in progress in April (Christison, JBNHS 43: 484); near Kabul and in N. Afghanistan (race?) between 13 April and 11 May (Meinertzhagen, *Ibis* 1938: 702). From the fact of single birds (same individuals?) frequently found roosting in the selfsame spots winter after winter — e.g. a particular niche or cornice in a ruin — the species probably 'home true' to its winter quarters.

GENERAL HABITS. Usually met with singly in well staked-out feeding territories, perched on the selfsame mound, bush or telegraph pole day after day on the lookout for creeping prey, bobbing its head up and down to focus on some movement in the grass, pouncing to the ground from time to time and returning with the victim to its base. But the kestrel's most characteristic method of hunting, in which it surpasses all other birds of prey employing similar tactics, is its hovering. As it quarters its feeding territory, 30 metres or so above, the bird suddenly stops dead in its flight face to wind, poising stationary in mid-air for many seconds at a time on rapidly vibrating wing-tips and fanned-out tail to investigate the ground below. On further suspicion the bird drops a step lower, finally pouncing silently on the quarry and bearing it away in its claws. In a strong headwind seems to enjoy remaining effortlessly suspended aloft, as on some invisible wire, for minutes together (once timed 5 minutes +, SA) with no movement except an almost imperceptible spreading and narrowing of the tail and tilting of wingtips, the bird often drifting backwards with the current. In hovering flight body held horizontally, not tilted to wind as in Lesser Kestrel, q.v. In the breeding season pairs engage in spectacular aerial display around their nesting cliffs, stooping and darting at each other, zooming upward with the wind currents and eddies, and hovering prettily on vibrating wings (quite distinct from normal hovering) to the accompaniment of a shrill *ki-ki-ki* or *tit . . . wee*.

FOOD. Chiefly insects, frogs, lizards, small rodents, and rarely nestlings or small birds. Specifically recorded: locusts, grasshoppers, mole-cricket

(*Gryllotalpa*), beetles (Coleoptera), winged termites. Above tree-line in Garhwal (c. 4500 m. alt.) mainly a single grasshopper (*Anaptygus* sp.) and a lizard (*Lacerta* sp.). Birds: crag martin (*Hirundo rupestris*), warbler (*Scotocerca inquieta*), painted bush quail (*Coturnix erythrorhyncha*) and lark (sp.?). Mammals: field mice, voles (*Microtus* spp.).

VOICE and CALLS. As above. No others recorded in India.

BREEDING. Season, in the W. Himalayas April to June. Nest, of twigs, roots, rags, and rubbish placed in a hole or crevice, or on the ledge of an inaccessible cliff; rarely in the wall of a ruined building. Occasionally a disused nest, e.g. of magpie or crow, utilized. Eggs, 3 to 6, oval, pale pinkish or yellowish stone-colour, profusely speckled and blotched with various shades of red. Average size of 100 British eggs 39.73×31.77 mm. (Witherby). Baker gives for 68 eggs (apparently this race and *interstinctus* mixed) 39.3×31.6 mm. Eggs laid at least at two-day intervals, sometimes three and even four; incubation period 27–29 days (Witherby). Both sexes incubate, but chiefly female.

MUSEUM DIAGNOSIS. Differs from Lesser Kestrel in wing formula (see diagram under 221). Brick-red mantle of male spotted with black. Claws black in both sexes v. pale yellow. For details of plumages see Witherby 1939, 3: 28–31; Baker, loc. cit.

MEASUREMENTS of nominate European birds:

	Wing	Bill (from cere)	Tarsus	Tail
♂♂	230–252	13–15	37–41	150–173 mm.
♀♀	235–267	—	—	— mm. (Witherby)

Of Indian specimens including breeding birds from W. Himalayas:

		(from skull)		
23 ♂♂	231–258	19–22	36–46	154–175 mm.
17 ♀♀	241–270	20–22	36–43	158–183 mm.
				(SA, HW)

COLOURS OF BARE PARTS. Iris brown. Bill slaty blue, black at tip, yellow at gape and base; cere and orbital skin yellow. Legs and feet yellow to orange-yellow; claws black.

223. **East Himalayan Kestrel.** *Falco tinnunculus interstinctus* McClelland
Falco interstinctus McClelland, 1840 (1839), Proc. zool. Soc. London, pt. 7: 154
(Assam)

Falco tinnunculus japonensis Ticehurst, 1929, Bull. Brit. Orn. Cl., 50:10 (New name
for *Falco tinnunculus japonicus* Temminck & Schlegel, 1844 in Siebold, Fauna Jap.,
Aves, 2, pl. 1 and 1B (Japan) nec *Falco japonicus* Gmelin)

Baker, FBI No. 1741, Vol. 5: 62

Plate 12, fig. 5, facing p. 224

LOCAL NAMES. As for 222.

SIZE. Same as the European Kestrel.

FIELD CHARACTERS. Indistinguishable from European Kestrel with certainty in winter when their ranges overlap. See Museum Diagnosis.

STATUS, DISTRIBUTION and HABITAT. Status uncertain. No evidence of breeding in Eastern Himalayas as yet. Breeding birds from NW. Himalayas, assigned by Baker as *interstinctus* (*Nidification*, 4: 41), shown by Ticehurst (*Ibis* 1923: 262) and Whistler (*JBNHS* 38: 420-1) not to differ from nominate race. Therefore, as presently known, only a winter visitor to the Eastern Himalayas (west at least to Nepal); Assam, Manipur, E. Pakistan (Sylhet, Chittagong), eastern India (Orissa), S. India (Coimbatore, Kerala). Also to Ceylon, and Andaman Islands (Biswas). But dispersal and numerical status imperfectly known due to great variability in the species, difficulty of discrimination and wide overlapping of the races in winter.

Extralimital. Breeds in Japan, NE. China, SE. Tibet, east Central Asia and Szechuan. Winters in India, Burma, (Indochinese countries?), SE. China.

GENERAL HABITS, FOOD, VOICE. As in 222.

BREEDING. Extralimital. Nest, eggs, etc. as in nominate race.

MUSEUM DIAGNOSIS. Differs from the nominate race in both sexes being more heavily barred above. Also has a bright foxy red phase not found in *F. t. tinnunculus*.

MEASUREMENTS. The range covers that of the nominate race. Three recent specimens from Nepal and Sikkim measure:

	Wing	Bill (from skull)	Tarsus	Tail
2 ♂♂	235-252	20-21	—	153-169 mm.
1 ♀	260	22	41	179 mm.
				(BB, SA)

COLOURS OF BARE PARTS. As in 222.

224. Indian Kestrel. *Falco tinnunculus objurgatus* (Baker)

Cerchneis tinnunculus objurgatus Baker, 1927, Bull. Brit. Orn. Cl., 47: 106

(Ootacamund, Nilgiris, S. India)

Baker, FBI No. 1744, Vol. 5: 65

LOCAL NAMES. As for 222.

SIZE. European Kestrel \pm .

FIELD CHARACTERS. Like the European Kestrel (222) but slightly smaller. Both sexes more brightly and richly coloured generally, with very rufous underparts. Not always distinguishable from other races. See Museum Diagnosis.

STATUS, DISTRIBUTION and HABITAT. Breeds in the Western Ghats complex from Khandesh south to Kanyakumari, including the Nilgiri, Palni, and associated hills; the Shevaroy Hills and possibly other portions of the Eastern Ghats. Breeds also in Ceylon (hills of the Central Province). Winter dispersal not properly known.

GENERAL HABITS, FOOD, VOICE, etc. As in 222.

BREEDING. *Season*, January to March in the peninsular hills (c. 1200-2500 m.); March to June in Ceylon (c. 1000-1440 m.). *Nest*, a sketchy pad of straw, etc. in a cleft or hole in a precipitous cliff, usually inaccessible. *Eggs*, 3 to 6, indistinguishable from those of the nominate race, q.v. Average size c. 38 x 30 mm. (Baker).

MUSEUM DIAGNOSIS. Adult ♂ differs from the nominate race in the upperparts being a deeper more foxy brick-red, lacking the characteristic faint grey wash or bloom. Top of head duller, darker grey, or even streaked rufous-brown as in ♀. Grey tail usually faintly barred. Underparts well tinged with rufous, the markings on central flanks of a somewhat different character. Adult ♀ richer brick-red above, heavily barred. Underparts differ from nominate race in same way as in ♂.

MEASUREMENTS.

	Wing	Bill (from skull)	Tail
16 ♂♂	221-242	c. 21-22	145-163 mm.
17 ♀♀	234-258	c. 22-23	145-175 mm. (SA, HW)

COLOURS OF BARE PARTS. As in 222.

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